The Builder.

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The "Enneakrunos" Excavations at Athens.

WE have already more than once drawn attention to the excavations carried on by the German Archæological Institute between the Pnyx and the Areopagos, and we are glad to be able now to lay before our readers a plan of the discoveries made, which not only shows the lie of the actual buildings found, but also makes intelligible the exact state of the famous "Enneakrunos" question. The plan is taken from our energetic Athenian contemporary, the Ἑστία, and accompanies an article by Mr. George Soteriades, a summary of which, with some additional commentary, we now proceed to give.

The excavations began at the point marked A, *i.e.*, a little to the north of the modern carriage road that leads from the lower town up to the Acropolis, and close to the place where the road to the modern observatory branches off. Even before the excavations were begun there were visible at this point remains of a cistern, though the position seemed a strange one if the cistern were intended to collect the water from the conduit hewn in the Pnyx rock which comes to light at the point marked I, *i.e.*, on the right hand of the carriage road as you go to the Acropolis, close to the road. The place was thoroughly cleared out down to the ancient pavement of what was once the Panathenaic road. And here we may pause to note that the first, and perhaps the greatest topographical service rendered by the excavations, is the fixing, beyond the possibility of doubt, of the route taken by this road. Generations of scholars and archæologists had assumed almost as an axiom for Athenian topography that the Panathenaic road went by the much shorter but far steeper route to the north of the Areopagos. The shortest road is not always the nearest. Modern Athens takes the longer and easier way, and relying mainly on the impracticability of the northern route, Dr. Dörpfeld always maintained that the road wound round to the south as marked, by his advice, in the plan of the Agora in "Mythology and Monuments of Ancient Athens." The lie of the Panathenaic road is, of course, of paramount importance in setling, *e.g.* the site of the Eleusinion; the position of the statues of Harmodios and Aristogeiton, and a number of other questions. It will be seen by a glance at the plan that the ancient road is by no means coincident with the modern one. The ancient one is marked ΑΡΧΑΙΑ ΟΔΟΣ.

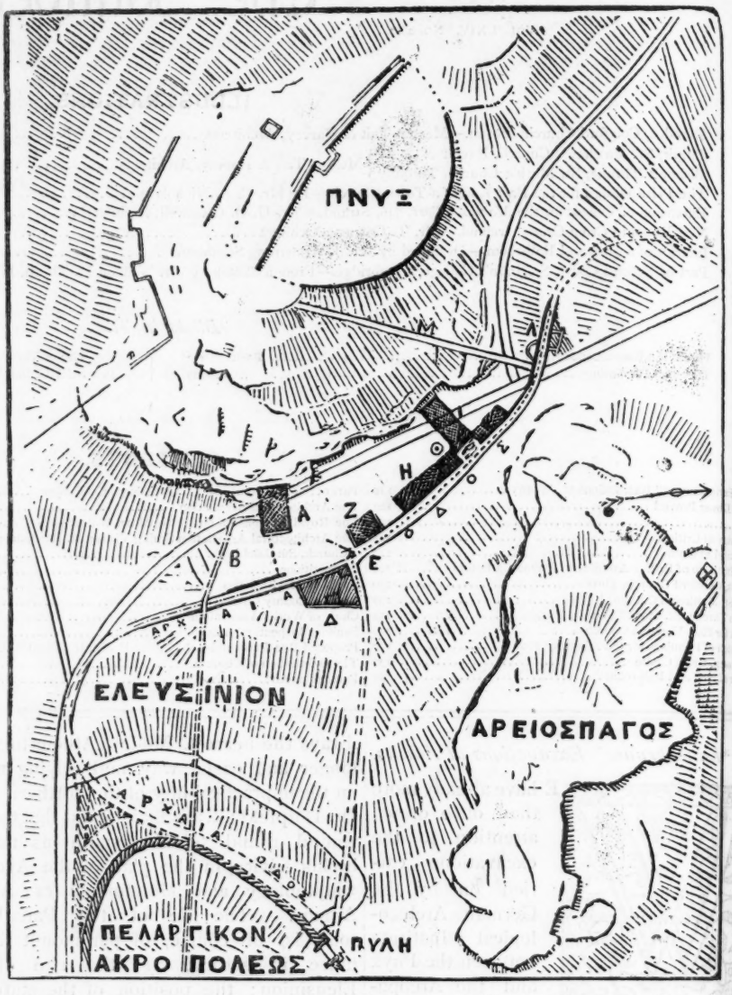
To proceed with the excavations. Close to point Λ a little further on the road Dr. Dörpfeld came upon a stairway leading up as a short cut to the Pnyx. This he cleared out as far as was necessary to determine its ultimate direction. It is marked M. Immediately after this point the old road cuts clean across the new, and naturally the excavations followed the old track. On its right side there came to light almost immediately a series of buildings which were wholly unlooked for. They are marked I, Θ, H, Z. They all date, by their masonry, &c., from the sixth century B.C. The most important is I, an oblong building which, from an inscription, "ΗΟΡΟΣ ΛΕΣΧΗΣ," is known to have been a lesche or hall—it extended backward from the ancient road to Pnyx rock. This lesche of the fourth century B.C. occupied in part the site of a still more ancient building, probably of the sixth century, which, owing to the rise of the level of the road and other causes not now ascertainable seems to have been early submerged. This early building was a small sanctuary of unknown dedication. It was surrounded by polygonal walls and contained a small shrine without a colonnade, in front of which was a round altar of poros stone. Two boundary stones belonging to this sanctuary were found, each bearing in archaic letters the inscription ὅρος; one was still *in situ*. It is exceedingly disappointing that there is no means of ascertaining the dedication. The building marked Θ is a private house built of polygonal limestone masonry. It is known to be a private house from the interesting fact that two inscriptions on its outside wall in letters of the sixth century state that it was heavily mortgaged. H is another large house, the front wall of which measures 25 mètres. Last of this group is Z, a house bearing the inscription "ὅρος οἰκίας πεπραμένης ἐπὶ λύσει," *i.e.*, "boundary of the house sold for redemption." The sum was 2,000 drachmas, to be paid to a certain Aristodemos. At E there branches off a short cut for foot-passengers only up to the Acropolis.

Δ marks the site of a perfectly unexpected discovery, *i.e.*, of a sanctuary to Asklepios. Pausanias mentions no such building, but from the character of the sculptures found there can be no doubt. A little further south, and still on the left side, the excavators came again unexpectedly upon two graves. They found also what they did expect, *i.e.*, a conduit. It was made of terra-cotta pipes, of excellent though archaic workmanship, and its object was to carry water to the Asklepieion, and also probably to the Eleusinion. These pipes were prepared with the utmost care, and soldered together with lead, and glazed inside and out in order to render them impermeable. It was clear that these pipes must belong to some important reservoir. At first it had seemed possible that the missing reservoir might be found near A, where, as we noted above, remains of a reservoir were discovered, but these proved to be of much too late date. It was not many days later that the real reservoir came to light at A. It was 10 mètres long, and the masonry of the date of Peisistratos. Here, and here only, could be the site of the Enneakrunos. Still further confirmation, however, was to be forthcoming.

The supply of water from the old Kallirrhoë before the gate was a limited one, and in hot weather apt to run short The ancient Athenians then had recourse to wells that they had sunk for such cases of emergency. Two such wells have now been found,

one close to the reservoir, and the other near the Asklepieion, and here *wells were filled up artificially at the time of Peisistratos*; that is clear from the fact that they are full of rubbish, consisting of remains dating only before his time, fragments of black-figured vases of that period, &c. The reason is clear. When Peisistratos by his new conduit brought an ample supply of water to the city gate—a supply that never ran dry—the wells were superfluous, and therefore naturally were filled up. They, as well as the small spring Kallirrhoë, were superseded by the Enneakrunos.

There will, no doubt, remain some scholars who are still wedded to the "Enneakrunos episode." These will argue that the Enneakrunos is on the Ilissos; the newly-found reservoir is not on the Ilissos, therefore it is not connected with the Enneakrunos. To such an argument, so based, even the spade can make no convincing reply. To others, the fact that the reservoir is where we should naturally (barring misconceptions based on Thucydides) look for the Enneakrunos, *i.e.*, just in front of the old city gate, where the ancient Kallirrhoë stood, coupled with the second fact that the pipes, masonry, &c., are all of the date required, and with the evidence of the disused wells, will seem enough. We may be a little disappointed that no Agrippeion, no Metroön, no Eleusinion have appeared, and that in place of them we have a lesche, private houses deeply mortgaged, and a sanctuary to Asklepios. We may feel that we must go back and reconsider the ordering of the building seen and described by Pausanias, and bear him a fresh grudge for not describing what we know he passed close by; but it is a satisfaction to reflect that we have one more spot where we can pin him fast—the Enneakrunos; and that we know for certain, step by step, at least, one stage of the way trod by the citizen of Athens when the Panathenaic procession went up to the Acropolis.



Plan of the Enneakrunos Excavations (from 2—Ἐστια—1893, p. 28).

COAL AT DOVER PROVED.

IT is an open secret that although various particulars have been published from time to time concerning the discovery of coal at Dover, people have been very sceptical in regard to the matter. Why they should is not very clear, for the information in general has emanated from those who are in every way responsible persons, aided by certain eminent scientists, and who were in full possession of the facts. It is not in human nature to give too much information on such a subject as the discovery of coal in a private experimental boring, for fear it should benefit a neighbour who had contributed nothing to the funds of the experiment. For our own part we have never doubted the statement that the coal had been found, and clearly said so some time since in our columns.* In geological circles, however, the discovery was regarded with suspicion, and that too, in spite of the circumstance that from theoretical grounds the occurrence of the Coal Measures in Kent had been anticipated years before. Perhaps the only reason why the general body of geologists had any doubt as to the coal found being of Carboniferous age was the absence of undoubted palæontological or palæobotanical evidence, of which they demanded production. Beds of Secondary age in the South of England produce thin partings of coal, or lignite, of no consequence; it was conjectured by the majority that the coal at first found in the Channel Tunnel trial boring was one of these unimportant seams; and the matter has until very recently remained in *statu quo*.

Within the past few months, however, in addition to the discovery of other seams in the Dover boring, fossil plant remains have been found, which are such as to place beyond the shadow of a doubt the Carboniferous age of the strata; and, further, the position of the coal seams has been tolerably well fixed with reference to those in Somersetshire on the one hand and the Pas de Calais on the other. These plants were submitted to M. R. Zeiller, the well-known palæobotanist of the *École des Mines*, Paris, and formed the subject of a paper recently published in the *Comptes Rendus* † of the Academy of Sciences, Paris. M. Zeiller states that the levels in the boring from which the plants came were 1,894 ft., 1,900 ft., and 2,038 ft. respectively, below the surface of the ground. We need not give our readers particulars concerning the whole of the plants found, but two, *Neuropteris rarinervis* and *Neuropteris Scheuchzeri*, are ferns specially characteristic of the top of the middle Coal Measures, or of the extreme base of the Upper Measures; the author inclines to the opinion that the Dover coal is of the former age. He says that they cannot be either more recent than the beds of Radstock in Somerset, or more ancient than the deepest beds of the upper zone (*Charbons gras et Ténus*) of the Pas de Calais. According to this evidence, therefore, there should, normally, be a considerable thickness of productive Coal Measures yet to be passed through at Dover.

In this connexion it may be well to give some particulars of the coal seams already found. We have before us a work recently issued (which has apparently been privately circulated, as it bears no publisher's name), by the Engineer of the Channel Tunnel Company, Mr. Francis Brady, C.E. in charge of the coal boring. In it he gives a brief account of the mode of occurrence of coal in the Pas de Calais and contiguous areas, together with qualities, &c.. and concludes that the coals of the French district alluded to increase both in thickness and value to the westward, instead of decreasing in both as was maintained before the Coal Commission in 1869. The Radstock series are also described.

According to Mr. Brady, the following coal seams have been found in the Dover boring:—

No.	Depth from Surface. feet.	Thickness. feet. inches.
1	1,181	2 6
2	1,273	2 0
3	1,323	2 0
4	1,356	1 3
5	1,500	2 6
6	1,614	2 3
7	1,808	2 9
8	1,875	1 8
9	2,082	1 0
10	2,222	4 0

The lowest and thickest seam was met with on December 19 last. Seams Nos. 4 and 9 will probably be found too thin to pay for working, but the thickness of the remainder is very satisfactory. We may remark that in Somerset all seams over one foot in thickness are worked. From the published analyses of the Dover coal it appears to be of good quality, in every way comparable with the French fuel to which we have referred. The cost of working, including royalty, is estimated at 6s. 6d. per ton, but would probably be less.

The question has sometimes been mooted, in the daily papers and elsewhere, as to whether the Dover coal does not exist at too great a depth for the practicable working of the fuel. As will be observed, the lowest mentioned seam is over 2,200 ft. from the surface, and in answer to these queries we may point out that in Belgium the majority of the pits are deeper than 2,000 ft.—between 1,800 and 2,700 ft.—whilst the depth of 3,900 ft. has been attained in one pit. A seam 1 ft. 6 in. in thickness is worked at 1,900 ft. in the Golden Valley pit, Bitton, Somerset The cost of sinking a 15 ft. pit to furthe

* See *Builder*, Vol. LVIII. (1890), p. 165.

† *Comptes Rendus, Acad. Sci., Paris*, t. CXV. No. 17, p. 626 *et sqq*.

prove the seams already discovered at Dover, and to commence the working of a colliery, is estimated at 40,000*l.*

The importance of this discovery of coal in the south-east of England cannot be over-estimated from a national point of view; but the idea of the altered appearance of the "Garden of England" when it is studded with collieries is not pleasant to reflect upon.

NOTES.

THE Imperial Federation League received but little more encouragement from the Postmaster-General last week than did the Decimal Association from the Chancellor of the Exchequer the week before. The reform advocated by the first-named body, however, will probably come long before a decimal coinage, and Mr. Arnold Morley's difficulties will not prove so insurmountable as Sir William Harcourt's. Popular opinion on the question of Imperial penny postage is certainly not unanimous, but, far from being hostile, it is distinctly favourable, although the change would involve loss of revenue. The Postmaster General says, however, that the Colonies are unwilling to agree to the reduction, and that it is impossible for the Government of this country to think of carrying out the proposal until the attitude of the Colonial Governments is more favourable. Mr. Henniker Heaton has stated that every Colonial Minister he meets declares that if the mother country would take the lead in this matter, it would be welcomed and followed; while a very representative Colonial gathering in London has voted in favour of it. It may, therefore, fairly be asked if the Treasury has ever really attempted to ascertain the feeling of the Colonies with regard to the proposed reform. Mr. Henniker Heaton is ready to start off to the Colonies at once, and pledges himself to bring back their united assent, if the Government will but promise their conditional support. The adoption of Imperial penny postage would doubtless be welcomed by many, though it would hardly accomplish all that the sanguine and enthusiastic "Member for Australia" predicts. The *Daily Chronicle*, which asserted that the present Government had practically made up its mind in favour of this reform, still sticks to its text; but the Postmaster-General's remarks certainly do not bear out the statement. He, if anyone, should know the mind of the Government on this subject, and his reception of the Imperial Federation League seemed to imply that the question was at present regarded as being outside the range of practical politics.

THE views of railway directors as to the recent revision of rates may be gathered from the remarks made at the half-yearly meetings and the statements in the reports. They agree in deprecating the disturbance to trade caused by the advanced rates and altered conditions, and also in throwing all the blame upon Parliament and the public. Mr. Dent-Dent repeated at York the plea that revision was called for, not by the railway companies, but by the traders; and remarked that it would almost appear that the public thought the object of the companies had been to take their revenge for having had the trouble of revising the rates, by putting them up to the very highest point they could. Having regard to the undeniable fact that the vast majority of the rates were put up in this manner, the public may well be excused for taking this view. As Mr. Mundella has said in the House of Commons, the companies might have approached this work in a very different spirit, even though they did find the time too short to do it satisfactorily. They would not then have been subjected to so much of what the Chairman of the Great Western Railway has petulantly termed the "senseless criticism of the outside world." That the officials chiefly concerned have had a very severe strain put upon them, no one at all conversant with the subject will entertain any doubt. A railway Chairman has said that if there was a society for the prevention of cruelty to railway clerks, the Directors would all have been prosecuted; and as they are now daily engaged in restoring a number of the old rates, it might be added that a great deal of their work must have been unnecessary. It is a singular fact that although constant reference is made by railway officials to the many reductions which the revision involved, and to the reticence of the traders with regard to them, not a single example is quoted as a set-off against the array of figures published by the numerous victims of advanced rates. Certainly it may not be expedient to particularise, but generalities do not always carry conviction,—especially when confronted with a host of specific examples.

AN Exhibition of Forestry is announced to be opened at the Earl's Court Exhibition grounds, to open on May 13. It is to be hoped that the promise of the prospectus will be kept; in that case the exhibition may be interesting and valuable; but it will require a very decided effort in this direction to efface the recollection of the pretensions and the failures of former exhibitions on the same site.

AN effort is being made to purchase the site of Launceston Priory by public subscription. Founded in 1126, the establishment soon became one of the wealthiest in Cornwall—a county, by the way, not over remarkable for the number or the importance of its monastic establishments, especially when the goodly number of the parish churches is considered. The buildings were so completely demolished at the dissolution that, for many years the site of the priory remained forgotten, and an enriched Norman doorway, of the period of the foundation, built into the walls of a hostelry, was the only relic visible above ground. A few years ago, accident revealed the exact site. During the excavations for a new gasometer, the workmen came upon the foundations of the choir of the monastic church and some attendant chapels, which were carefully explored by Mr. Peter, the historian of Launceston, who published a description of the remains that were then discovered. Many fragments were met with, which proved that the buildings must have possessed considerable architectural beauty. The site being a damp one, it was found that the builders had taken the precaution of laying their foundations upon walling formed of dry stones. By this ingenious device, the water had percolated through them while the walls above were dry and firm. The priory buildings extended into a meadow adjoining St. Thomas's Church and churchyard, and by the courtesy of the owner, Mr. Trood, some general explorations have been made within the past month by the Launceston Scientific and Historical Society. Several bases of piers, with foundations of walls and other relics, have already been found, and the explorers are encouraged to proceed with their work. Mr. Trood now offers to sell to the Society the most promising portion of the site, about a quarter of an acre in extent, and it is stated that the whole area can be explored, and the site purchased and fenced in for permanent preservation for the very moderate sum of £150. The offer of the owner to sell at a moderate price, such as this sum indicates, certainly ought not to be lost, and when it is remembered that the land is in close proximity to the important town of Launceston, it is evident that if not now accepted, it may not be possible for it to be purchased for so reasonable an amount later. Mr. Otho B. Peter, hon. secretary of the Launceston Society, a relative of the historian's, will gladly receive subscriptions in furtherance of this very desirable object. His address is, Northernhaye, Launceston.

THE advertisement which we publish this week from the Leyton Local Board, announcing a competition for New Board Offices and a Technical Institute, marks a new step in the exactions put upon architects by competition committees. This time it is not one guinea, but five guineas, which architects are invited to advance before they can gain any knowledge even of the conditions of the competition, beyond the mere statement of the premiums offered. If the conditions of the competition were fully advertised, and a deposit-fee were charged for a plan of the site, in order to keep away idle inquirers, there would be some reasonableness in the demand. But nothing is stated in the advertisement from which any architect could decide whether he would choose to enter into the competition or not. There may be no assessor appointed (none is named in the advertisement), there may be too much asked for in comparison with the extent of the site or the amount to be expended; there may be half-a-dozen different reasons why an architect of judgment would not choose to meddle with the competition; and he cannot ascertain this without running the risk of forfeiting five guineas. We hope the profession will show their opinion of this new exaction in a practical manner. If a dozen architects of known reputation in planning the class of building required were to write to the Leyton Local Board and say that they declined entering into the competition unless the instructions were furnished to them without any payment, they would do a service to the profession and read a useful lesson to the promoters of competitions.

MESSRS. J. A. Lumley & Co. will offer for sale at auction, next Spring, the ancient and historical estate, divided into farms and small holdings extending over 2,000 acres, known as Hedingham Castle, near Halstead, in north Essex. William I. gave Hedingham (or Heningeham), together with thirteen other lordships in that county, to Alberic de Vere, and the castle,—of which the Norman keep yet stands,—has been held from the Crown by his descendants, the Earls of Oxford, for a period of nearly 650 years. The keep, standing on a partly artificial eminence, is supposed to have been built *temp.* Henry I. Mathilda, Stephen's consort, died within its walls, 1152. It is right-angled on plan, with a squared turret at each corner, and measuring 55 ft. from east to west, by 62 ft. from north to south, rises to five stories, including the basement. When Wright wrote his "History of Essex" (1831) only two of the angle-towers stood above the roof, to a height of 110 ft. He describes it as built of flint and stone, embedded in mortar, faced with neatly squared calcareous stones, which it is supposed were quarried at Barnack. The east wall is 1 ft. thicker than the three others. The ballium, 3a. in area, contained some towers and buildings erected by the thirteenth earl *circa* 1490, but most of them were demolished one hundred years later, and the keep was despoiled in 1666, in order, it is said, to frustrate its use for prisoners of war. There are plates (and a general view, title page, Vol. II.) by W. Bartlett in Wright's "Essex"; Brayley and Britton's "Beauties" (1803), after E. Dayes; and Morant's "Essex," Vol. II. (1768). The last-named, by Olive, shows the mansion erected by Robert Ashurst near the keep, *circa* 1720, and in the corner a view of the keep as it appeared in 1665, with a similar tower having two octagonal turrets within the ballium. The reader should also consult the description by L. Majendie, the then owner, with plans, sections, and views (1796) in Vol. III. of the "Vetusta Monumenta." Alberic, first earl, and his wife, Lucia, founded here a convent for Benedictine nuns which, at the suppression, was valued, *teste* Speed, at 29*l.* 12s. 10d. per annum. Hedingham Castle suffered two sieges in the civil wars of King John's reign, and was captured by Lewis the

Dauphin in 1217. There are some monuments to the De Veres in St. Nicholas parish church (built by the second earl), including that of John, fifteenth earl, Henry VIII.'s Lord Chancellor, who died in 1539.* It was here that Henry VII., after having been sumptuously entertained by John, thirteenth earl, took umbrage at his host's array of liveried retainers, saying, "My attorney must speak with you," a rebuke that cost John de Vere 15,000 marks. Morant says he cannot account for the origin of the name of Hedingham-Sibil parish; it perhaps was so called after Sibil, daughter and heiress of Manasses, Count of Ghisnes, who, by her marriage with Henry, castellan of Bourbourg, was mother to Beatrix, wife to Alberic de Vere, who, dying in 1088, was buried in the priory he had founded at Earls Colne.

ST. PETER'S CHURCH, St. Albans, to whose proposed restoration by Lord Grimthorpe we adverted last week, is one of the three (the two others being St. Michael's and St. Stephen's) which Ulsinus, sixth Abbot of St. Albans, built in the town, *circa* 960. Two transepts, a chancel, and a central tower with low spire were added about 150 years later; and in the latter half of the fourteenth century the nave, aisles, and chancel were rebuilt. Vol. VII. of the "Beauties of England and Wales" describes an attempt that was made in 1785 to sustain the tower, 33 ft. square, with four timber props, placed at the crossing, which were encased in brick-work cemented over. But matters became worse; so, in 1799, the tower, chancel, and transepts were pulled down, and borrowing powers having been obtained through two Acts of Parliament, the outer walls were rebuilt, of brick, under the directions of Robert Chapman, architect and surveyor, who built also what Cussans, in his "History of Hertfordshire," calls the "beastly brick and plaster-encrusted tower," 67 ft. high. The former chancel extended 40 ft. eastwards beyond the present one. This church is noteworthy as being the burial-place of Edward Strong, of New Barns, in the parish, citizen and Mason of London, *obiit* February 8, 1723, *ætat.* 72. An inscription on his mural monument sets forth that—

> . . . . In Erecting the Edifice of St. Paul
> Several years of his Life were spent
> Even from its foundation to His laying the Last Stone. . . . .

There is an altar tomb in the churchyard to Dr. Cotton (and his two wives) at whose private asylum in St. Peter's-street Cowper stayed more than eighteen months in 1764-5. The second battle of St. Albans was fought on Barnard's Heath, half-a-mile distant, and in St. Peter's churchyard were buried many who fell in that and the previous battle. Leland saw Sir Bertin Entwysle's memorial, and Weever records the epitaph of the Babthorpes, father and son. Cussans says that to this church was removed, in 1725, one of the oldest organs in England, built by Ralph Dallans, who died 1672, for St. George's Chapel, Windsor. Dallans was buried at St. Alphage, Greenwich, near to the grave of Tallis, *obiit* 1581. In 1889 the bells of St. Peter's were rehung, the belfry and ringing chamber refloored, and the tower repaired within, at a cost of 300*l.* under the superintendence of Mr. F. W. Kinneir Tarte, architect.

WE see from an article in the *Liverpool Daily Post* that it is proposed to build a great hotel along the line of pier parallel with the great landing stage, including also new baths to replace the old ones which have long stood on the pier adjoining the Liverpool landing-stage. There is no doubt that a hotel close to the landing-stage would be an immense boon to passengers landing from ocean steamers, who at present have to go some distance into the town for a first-class hotel; but we should like to point out that the erection of such a large and lofty building as is proposed in the sketch published in the Liverpool paper referred to, parallel with the shore-line, would have a more or less detrimental effect in checking the free circulation of the sea air into the low-lying and crowded portion of the town behind, and that a building placed at right-angles to the river would, for this reason, be preferable. The lofty dock walls of Liverpool are already an injury in this respect; it would be better for the sanitary condition of the town if they were down; and the proposed hotel would, besides, block the view of the Mersey from the town. The long low building of the old baths, with its colonnade, will be regretted by some as a characteristic example of the "classic" taste of the earlier part of the century, though we do not argue that it should be retained on that account. But we deprecate the interposition of a long and lofty building between the town and the open water of the Mersey.

* For a notice of other monuments to this family, in Hatfield Broad-oak, and Colne Priory churches, see our review, April 18, 1891, of Mr. Frederic Chancellor's work, "The Ancient Sepulchral Monuments of Essex." Alberic de Vere founded Colne Priory, whither he retreated as a monk

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IN a recent number of *Le Génie Civil* (vol. xxi., p. 189) there are some interesting particulars of a new system of utilizing cement for the construction of water-pipes and vessels. It is known as the Bordenave system, and consists of the employment of a framework of iron bars on which the cement mortar is placed. In pipe-making, bars of I section are used, and the chief novelty appears to consist in winding these in helical form, the pitch of the helix being governed by the strength required to withstand the internal pressure. The working stress is taken at 9·8 tons per square inch; so that for a pipe 2 ft. 7½ in. inside diameter, using a bar ½ in. height by ⅛ in. in width, the requisite pitch is 3·8 in. for a head of water of 33 ft. The weight of the bar would be 0·14 lb. per lineal foot. In the manufacture of what are described as cylindrical reservoirs the structure is formed in the same way, but has a bottom worked in by means of a framework of radial and circumferential bars. Verticals are placed at intervals all round the wall, and solidly attached to the floor. The pitch at which the spiral is wound diminishes from top to bottom, in order to give greater strength at the lower part, where there is, of course, increased pressure owing to the greater head. An experimental line of piping, four miles long, has been made to test this system, and the results have shown the calculations given as to strength to be sufficient. The iron is well protected, so that it will not rust, and, moreover, the co-efficient of expansion and contraction of iron and cement are nearly the same, so that the cement is not likely to crack off. It is said there is a saving in cost over iron pipes, either cast or wrought, of 15 to 45 per cent.

ON Monday, the 13th inst., Mr. S. Bidwell, F.R.S., gave an interesting lecture at the London Institution on "Electricity and Heat." After briefly referring to, and illustrating, the heating effect of an electric current, and the enormously high temperature of the electric arc, he passed to the effect of temperature on the resistance of conductors. This he curiously illustrated by a platinum wire, rendered incandescent by a current through it, part of which was wound into a coil so that it could be conveniently cooled by water. The effect of lowering the resistance of the whole by cooling this part was shown in the increased brightness of the part which remained incandescent. The very great fall in the resistance of *pure* metals at the low temperatures obtained with liquid oxygen, by Professors Dewar and Fleming, was next alluded to, and the speculation that at absolute zero they would have no resistance at all. The lecturer next called attention to the fact that non-metals, unlike metals, had their resistance lowered by heating, and gave his results in some experiments on selenium, a material which behaved as a metal at low temperatures and as a non-metal at high temperatures, the change taking place at 20° C. A mixture of carbon and sulphur was found to behave as a metal, though each of its constituents is a non-metal. After explaining, and experimentally illustrating, the chief phenomena of thermo-electricity, the lecturer connected the ends of an iron wire to the galvanometer and heated it with a spirit-lamp; as he moved the lamp, a current was set up in the wire in the direction of its motion, and he said that some theorists were disposed to account for the earth's magnetism in this way, the upper strata of the atmosphere taking the place of the wire and the sun that of the lamp. In conclusion Mr. Bidwell discussed the possibility of obtaining light with far less expenditure of energy, showing that there are two directions in which we may hope for improvement in this respect. On the one hand, we might save the wastefulness of the steam-engine if the energy of coal could be directly converted into electrical energy; and, on the other we might follow Mr. Tesla's lead, and aim at obtaining "light without heat." He deprecated any further attempt to make the thermopile practically efficient, saying that it had been demonstrated that at least 299 parts in 300 of the heat used in them was wasted.

THE paper on "Scenic Art" read by Mr. Herkomer last week at the local German "Society of Arts and Sciences" in London was a very interesting one, proposing numerous rational improvements in the mounting of plays, illustrated by some good figure studies and a neat wooden model of a theatre proscenium. But it must be said that except in a few minor cases (most notably as to the stage rendering of a rainbow), the proposals could have been by no means new to his audience on that occasion. The various arrangements which his experiments have induced him to adopt at the Bushy Theatre, are to be found, in part or wholly, on such of the German and Austrian stages as are already managed by scientifically trained experts instead of the too conservative stage carpenter. His convertible framing to a stage picture, his diffused light, his abolition of footlights, his moon, &c., are all forthcoming on many German stages, and have also received theoretical treatment in text-books such as those of the Asphaleia Company, MM. Foelsch, Sturmhoefel, and others.

AN important illustrated work on Greek vase-paintings, by Miss Harrison and Mr. D. S. MacColl, will be issued shortly by Mr. Fisher Unwin. Miss Harrison, as is well known, has made the subject of Greek vase-paintings a special study, and her knowledge of it will give additional value to a work which is also to be illustrated by a number of large-size plates giving reproductions from the original vase-paintings.

WE have received from Mr. Batsford Part V. of Mr. Gotch's valuable collection of illustrations of "The Architecture of the Renaissance in England." It is fully equal in interest to the preceding Parts, and includes reproductions from photographs of Condover Hall, Aston Hall, Brereton Hall, Burton Agnes (with a view of the splendid staircase), Middle Temple Hall, Cobham Hall, Hatfield House, and other buildings. As before observed, we reserve more detailed notice till the whole work has been issued, which will be complete, we believe, with the next Part. The same publisher announces the appearance shortly of Mr. A. N. Prentice's illustrative work on Spanish Architecture, which is certain to be of a high class in regard to the drawings, as all who know Mr. Prentice's ability as a draughtsman will be aware.

THE eighth annual report of the "National Footpaths Preservation Society" shows that the society is actively working for the public benefit in this respect, and with a very large measure of success. The report gives some extraordinary and most discreditable instances of the means that have been taken by some landowners to annoy and injure people making use of customary footpaths—fastening large fish-hooks in the grass, for example. We note one case in which a resident lady offered a new clock for the parish church on condition that a public footpath was stopped. It is to the credit of the local vestry that they declined the offer.

THE sixth issue of the Transactions of the "Cremation Society of England" contains plans and sections of the improved Gorini Cremation Furnace made by Messrs. Newlands for the society. The report includes a reprint of the debate in Parliament on the disposal of the dead (Regulation) Bill on April 30, 1884, and a list of publications dealing with the subject of methods of burial. The report does not convey the impression that the society is making very much way, so far, in its objects.

UNDER the heading "A disgrace to London" a "Q.C." writes to the *Times* of Tuesday with another of those demands to pull down St. Mary-le-Strand which people make from time to time when they find themselves delayed in the narrow part of the Strand. A cab-horse had fallen and blocked the road, therefore St. Mary's must come down of course, and be built up elsewhere. The answer to this is simply that St. Mary's is just what gives the Strand its chief picturesqueness, and to remove it would be to destroy for ever one of the most charming effects in London. In Paris there would be an outcry at the proposal to remove a building of that kind from such a position. It has been promised over and over again that the Holywell-street block should be removed, and a roadway made on each side of the church; and the delay in carrying out that improvement is a reasonable cause of complaint. But one can only look with contempt on the captious folly and Philistinism which, at an accidental stoppage in the street from an exceptional cause, will immediately clamour for the destruction of an important architectural monument. As a matter of fact, the statements about the stoppage of traffic alongside St. Mary's are grossly exaggerated. We have frequently had to drive past it in a cab, and never met with any greater delay at that point than is commonly to be experienced along the whole length of Fleet-street and Ludgate-hill.

THE VALUE OF CRITICISM.*

IT is longer than I care to say since it was my privilege as a student to form part of an audience at the fortnightly lectures of this Association. The completion of a decade is a personal matter of some importance, but viewed more broadly, such a lapse of time is insignificant, for we remember the magnitude of the quest upon which we are all bound. Thus it certainly does not warrant my appearance before you as seer or prophet; and indeed I venture to think that this is hardly demanded by an association of students. I will therefore ask you to listen to me as a fellow student, who a little older perhaps than many of you, ventures to address you upon a matter which must be a subject of importance to us all, and especially during these years which immediately succeed that period of training for which this Association was formed. It was said of the Sophists, that they believed themselves to be imparting education, whereas they were only imparting results, and the same is true in a greater or less degree of all elementary teaching. Early years of training must be largely occupied in acquiring fact and information, and that at second hand. And this means is very valuable. It is a speedy method of finding out what we do and what we not want to learn. To this end, the teaching of the Association has been greatly enlarged since my time. A feast of endless courses has been provided, and my advice to you would be to systematically try them all. Your several powers of digestion will soon reveal to you your capacities of assimilation; and it is when this knowledge comes to you that the true period of education—the leading out of what is within you—commences. For at this point a new and important factor comes into operation, namely, the colouring of your knowledge by your own particular individuality. So long as you are conscious of learning only what must or should be acquired, there is no response from the living, sensuous side of your nature. But when you have discovered what those studies and pursuits are that train and excite a way of regarding things peculiar to your nature or kindred natures, you are entering upon that critical state which will thenceforth dictate the appreciations and depreciations of your life. What we mean by criticism, then, is the expression of a judgment formed by the union of knowledge and self; knowledge alone constitutes a mere inventory, and self alone evokes but an expression of opinion.

For this process of thought, the union of knowledge with self, the Greeks had a name that is more expressive than any exacting definition—imaginative reason. Such a state you will find may be reinforced by all manner of knowledge and experience, for the *individual* quality forms the necessary link between things that are by themselves unrelated. And this relative knowledge is of the utmost value, for it is reliable when specific information is not available. It is like good money, which will pass currency in all countries, irrespective of nationality, while it further permits you to approach a subject from many different sides; a power, if I may put it so, which enables you to model thought rather than depict it in a linear manner from one point of view only. How we shall train and direct this imaginative reason is surely a question of the utmost importance, for if our natural temperament, which we have elected dictator, love well but not too wisely, we may readily fall into bad habits, and acquire a fatal moral or intellectual squint. This question Matthew Arnold has answered so truly and so shortly that I will ask you to accept his advice. We are to know the best that has been done in the world if we would be critics.

It is clear, I think, from what I have said, that I do not propose speaking of the professional critic, of whom it has been written that he will be chiefly remembered by what he has failed to understand. The intelligent craftsman who writes for the limited sphere of his own craft, belongs to a remnant insufficient for the general salvation. It was Mr. Toots who spent so much of his time in writing letters to himself, and it is the public who addresses the public in that class of literature upon which the general *taste* is formed. The interpretative power must be in ourselves and ready to hand. We must each one of us know the best that has been done, and we are to know this best for two reasons, that it may correct a wrong estimate of the importance of ideas, and also create a current of ideas that are true and fresh. This high standard upon which we are to model our judgment is of especial value, since it saves our self from merging into mere egotism. By it we are brought rather into agreement with our fellows than into antagonism, for most things contain something of the best which renders them worthy. A dewdrop may appear insignificant to us until we remember that it is fashioned by the same laws that form the spheres.

Let us now look back upon architecture, that for our guidance we may regard the best that has been done. And we shall find in doing so that just as criticism is a union of knowledge with self, so architecture, and indeed all creative work, is a union of self with some quality or other. In this way the *subject* of inquiry, and the *method* of inquiry, will often help to explain each other. By knowledge, I do not mean information alone derived from books. The Greeks, who have given us our modern ideas, had no books, and deprecated all written thought, since it limited those powers of expression which conversation gave such opportunities to. They rather perceived fact, as some blind folk are said to be aware of a blank wall before them without touching it. We shall see, I think, in the outset that architecture divides itself into two groups, to take a proper estimate of which an important claim is at once made upon our critical faculty, viz., the capacity to differentiate between the *communicable* and the *incommunicable*.

Many types of art of which Greek art is the completion have reached the forms they present to us by gradual evolution. The original germ of these forms is known, just as the derivations of a language are known, and by tacit consent these forms have been accepted universally as the fit expression of certain universal ideas. These forms are, therefore, capable of interpretation—communicable just as a language is. On the other hand, that style of architecture which succeeded the Greek, viz., Gothic architecture, is largely incommunicable, the spirit of it entirely so by reason of its forms and characteristics not being the result of a general consent, but, on the contrary, the will of the individual artist predominates. It has, for instance, been pointed out how dangerous a model Shakespere is to the young poet by reason of the personality which pervades and colours his style. The same may be said of all the finest art of the Mediæval and Middle Ages. It will be my purpose now to provide some material towards the building up of these two great types, from which each one of us may fashion as he will what to him befits the immortal.

To ideas which are communicable I give the name of Metaphysics, and the incommunicable I call Caprice; and it is out of the strange and wonderful admixture of these elements that architecture is born. "The best physician is also a philosopher," said a wise man; and Mr. Ruskin has lately told us that the best architect is also a metaphysician. Now, what are metaphysics? We will take as an instance what Professor Huxley calls the metaphysics of sensation. He describes how we perceive a rose to be scented by reason of certain particles of the flower impinging upon a sensitive organ. The effect is translated along the nerve fibres until it reaches the sensorium, that portion of the brain which is related to the excited nerve. This operation, as far as the sensitive organ is physical, belongs to physics, and its action can be demonstrated; beyond this point the operation belongs, he declares, to metaphysics, and its character is not capable of demonstration. One knows the result, and that is all. It is the same with the point in question. The application of certain natural and physical laws are devoted to the development of certain architectural results. The nature of the forces employed is known and can be demonstrated. How and at what stage they cease to be forces and become architecture, and yield us pleasure, as the scent of a rose yields us pleasure, cannot be demonstrated. Yet these forces and their architectural resultant are clearly so nearly related to each other, that we may learn much about the latter, by an understanding of the physical laws at work, and that physical condition, which is of first importance, and shows itself throughout the whole of Greek art, is *rhythm*. We find this element not alone in ornament, as set forth in beads, recurring rosettes, and such like examples which are common to all decorative epochs, but we also recognise it as the keynote of all Greek masterpieces. The drama for instance is derived from the rhythmic dance, performed at such seasons of the year as were important in the lives of vine plants, when at the feast of Dionysos, a chorus of fluting dancers was headed by the wine god. To this dance came to be added a dialogue between the god and the leader of the chorus, and so by the introduction of further dialogue did the drama grow. But the rhythmic element was never absent. The verse is now leaping, now flowing like a stream, and now caught up by the chorus and whipped into a tempest of passion as the dancers swayed their procession through the orchestra.

In sculpture it is the same. An early frieze shows us processions of identical figures or beasts which are rhythmical by reason of their repetition. Then the action becomes more complicated, and pause and motion succeed and interweave with each other, its effect becoming heightened by its intricacy.

In the later drama, the exigencies of plot shrouded much of this constructive element, as in later sculpture the ethic school gave way to the pathetic, and the breadth of the grand style became lost amid pictorial effect, but in the best time of both the drama and sculpture, the architectonicè of each was of prime importance.

In these fields did rhythm manifest itself with a greater ease than was displayed by architecture of a similar period. Architecture is a fugue upon forces, and these forces had to be overcome or assimilated before a kindred freedom could declare itself.

Rhythm, I need not tell you, is an ever-present phenomenon of nature. No force acts continuously, but in leaps and bounds. You will be

* A paper by Mr. C. J. Tait, A.R.I.B.A., read before the Architectural Association on the 10th inst., as elsewhere mentioned.

conscious of this when you put a stick in a running stream and the stick beats in your hand. Our own organism is dual and not singular, while physiologists will tell you that our nerve-force proceeds in jumps and is not continuous. This property of forces at once presented a decorative aspect to the Greek mind, and was expressed in their architecture by the play of action and reaction. Thus to have so disposed the weight in their buildings as to dissipate a portion of the thrust laterally, as by a flying buttress, would have been a violation of this rhythmic sense. It is fully evident that the arch was at their disposal had they chosen to adopt it, but its use must have broken this cherished beat in their buildings. Ornament is regularly recurrent, and it is never sought to vary its monotony. This restrictive faculty is unquestionably limiting to imaginative purpose, and the Gothic builders, feeling this, varied the detail of their repeating ornament and produced a harmony of forces by interweaving their thrusts. Harmonies of this kind the Greeks never aimed at. It necessitated a want of due balance in one direction or another, abhorrent to their sense of measure. Their conception of ordered motion was that of a star revolving round a sun, and not the course of a comet which approaches from and disappears into space. Such an apparent dissipation of energy would have been an æsthetic blunder. Concessions to truth which later ages have been willing to make is aptly illustrated by musical tones, which in the Greek scale were in true and perfect intervals, but which for the purpose of obtaining harmonies, that is, the striking of two notes together without discord, have been artificially rendered imperfect in their interval.

While all architecture is, as I say, a fugue upon forces, Greek architecture is pre-eminently a fugue upon the conservation of force, in the working out of which *proportion* and *symmetry* are evolved. Proportion is simply another aspect of rhythm, it is the relation that one mass bears to another. If the attraction of one prove too great in a building, then that building is out of proportion, or since the area upon which the building stands forms one of the masses to be taken into account, if this area be overloaded or underloaded, the rhythmic reaction is inaccurate, and the whole block conveys a sense of disproportion. Any building crowded round by houses is thus always at a disadvantage proportionately, for you are unable to appreciate the area upon which it stands. Symmetry is but rhythm marshalled into order, and the rhythm of parts arranged towards the production of a total effect. A crystal or a flower are very evident examples. The relation of the entablature to the columns is proportion, that is, the weight carried to the reacting support. The relation of a number of such instances as they together form a whole, becomes symmetry, the final step.

These effects produce the typical classical temple style, and it is to these that the sculptor adds, if sculpture be employed, a fresh element, viz., *bias*. Proportion and symmetry complete an arrangement of forces at rest. Bias, or direction, belong to forces in motion, yet still in equilibrium. It is surplus force, and we see its action in the movement of a star when it moves round a sun by reason of the surplus force which it evolves. It shows itself in a subtle, if unpronounced way, in the profile of mouldings and in the ornaments painted or carved upon them. The cyma is a moulding leaping in its form, and is typically the crowning line of a structure. It is as vigorous as as some flamboyant poppyhead cresting, allowance being made for the fact that its function is horizontal as well as vertical. The echinus, which exactly resembles a claw, possesses the gripping and supporting outline, and there is no sense of dissipation marked in its profile as in that of the cyma, but rather the force expressed in its outline returns upon itself. The ornament, again, which is painted upon the cyma, is the upward clustering honeysuckle, while that upon the echinus is the egg and dart which graphically explains the feeling of the mouldings.

There are plays of detail which impart freedom within the strict limits of architectural line, but it is in the sculptural frieze and pediments that a more unreserved freedom is to be sought. Yet it is not the freedom of caprice. Its laws are very definite; indeed the sculptor could not have dared the flights he essayed had he not thoroughly known his limitations. In the Parthenon frieze we find what is but a neutral band made to serve a very definite purpose. By reason of the slowly-moving procession sculptured upon it, diverging in two lines from the centre of the west front, the interest of the spectator is conducted to the entrance situated in the east or principal front. Individually the figures of horses and riders or maidens may be observed to be in perfect equilibrium, and could move backwards as readily as they could forwards. But the long column of processionists heading in one direction produces its effect, and a steady and balanced tendency is directed towards the focus of the situation, where the dramatic scene of Athenè's birth is being enacted. Here, in the E pediment, what we find is not a mere pictorial rendering of the event, or what might be supposed to be the conditions of such an event, any more than the frieze actually represents the Panathenaic procession, with its ship bearing the floating peplos, which was so evident a feature in the scene. The figures of the pedimental composition are equally chosen for architectural effect, and the fact that the groups are turned from the centre of interest, when viewed merely pictorially, has led to all manner of conjecture as to whether they are gods or mortals, symbolisms, or what not. Viewed architecturally, however, it is evident, I think, that since the raking lines of the cornice must be counterbalanced, the action of the figures must be from the centre outwards. The effect of this grouping is so important that it cannot be allowed to be an accident of composition. The strength thus added to the building lines is seen at once in comparison with such examples where the direction is inwards, as on the temple of Zeus at Olympia, or Athenè at Ægina. The sculptures at Ægina are elementary and tentative, while those at Olympia are careless in their execution. The keynote of the Parthenon, however, is the absolute completeness displayed in both the conception and finish of its detail, and the evidence of intention which is observable in every line of it. The forces suggested by the raking lines of the cornice must meet and drop, and although translated into the new medium of pictorial line, the action continues one with the architecture, and the scattered vigour directed towards the angles is caught up again by the architectural lines.

The Parthenon frieze and pediment sculpture are the example of what I take architectural sculpture to be. It is not embellishment, calculated to give effect to an otherwise bald and inexpressive production, as sculptors have lately given us to understand. It is architecture transposed if you will, or its musical score arranged for another instrument.

There is no reason to suppose that these masterpieces were executed by other than skilled masons. Architectural sculpture and sculpture proper were two perfectly distinct trades with the Greeks. The sculptor of the Phigalian frieze was the architect Ictinos, and Pythios, the architect of the Mausoleum, executed the famous chariot group. Pheidias, as comptroller of works, doubtless picked his men, and these men were moreover Athenians, and not provincial. Pheidias is a household word among us, but we know nothing individually about him, save that he died in prison, and his contemporary Myron in much poverty. Of the studio ghosts who must have worked these wonderful marbles, we know absolutely nothing, much to their credit as artists.

Mr. Brett, when discussing architecture from a painter's point of view, hinted that she was far too ready to accept help from the allied arts, and he would like to see her rather express her whole self and nothing but herself. And such a sentiment is most corrective. There is too much stress laid upon the so-called unity of the arts, and the justification for it is, I think, not conclusive. Painters have been in the first place painters of easel pictures, and sculptors have been creators for dedication and portraiture in all periods, and when for an exception Raphael left his Madonnas to paint academic proprieties in the Vatican or Tintoret placed his precious work where it cannot possibly be seen, such result of co-operation is at least open to remark. And we should further note this, that as the painter and the sculptor came to the front, architectural painting and architectural sculpture went to the wall. From the gossip that hangs around the lives of painters like Zeuxis and Apollodoros, or the sculptor Lysippos, we may judge that their free and popular treatment produced a far greater impression than the grand style of the painter Polygnotos, the decorator of the Theseum, or of the unknown Pheidian sculptors who wrought the Parthenon frieze. As a matter of fact the Greeks exercised a rigid distinction and did not include architecture among the liberal arts (ἐλευθεροι τεχνη) where they placed painting and sculpture, but among the useful arts which we now call the crafts. Sculpture gradually became an embellishment as applied to architecture, as it continues to be, and as folk seem satisfied that it should remain. It is you architects who can revive its old feeling, if it may be done at all, and to this end you should know the figure sufficiently to enable you to make details of your sculpture where you employ it, as you would for any other portion of your design. While you may work from the life, you should more particularly study the best sculpture itself, for we learn art from art and not from nature, who is our inspirer and not our master.

There is yet another quality which we may notice, and the value of which we may appreciate from the study of Greek work, prompted as it was by the nation's acute perception of what is due, even to the materials employed. The history of sculpture especially shows us that the early years of artistic activity were directed to acquiring a knowledge of material. The Parthenon marbles are among the first examples to testify to this power over material having been obtained. In the metopes, this struggle is still either intentionally or otherwise apparent; and these, like the Æginetan sculpture, possess that woodiness which fitly expressed the Dædalean, or Wooden Age. The large surfaces and the sharpness of detail which fine sculpture shows us are demanded by marble. In the Olympian sculptures, which immediately precede the Pheidian, they had arrived at the large surfaces but not the sharpness of treatment. In examples immediately succeeding that age, largeness of surface showed evidences of being undervalued and sharpness exaggerated into flicker, as in the detail of Nikè Apteros.

These considerations, then, are some of the metaphysics of architecture. I have traced them as far as I am entitled to; their effects as architecture I must leave you evolve and to admire. Let me conclude a review of these considerations by pointing out that I have avoided any suggestion that these elements were derived from the contemplation of natural phenomena, as flowers, the seasons, tides, and so forth. This may or may not have been their origin. It should be sufficient for us that we ourselves are a part of Nature, and her laws and methods intervene in our lives equally as in the life around us. We are expressing ourselves when we employ these laws and methods as a language, and this is the function of art.

Although nearly everything which we now value has been bequeathed to us from the Greeks, Greek art, as a concrete expression, died in the third century before Christ. We are still influenced by its suggestions, but not by the unity of its life. A new spirit, demanding new expression, sprang up with the Roman civilisation, which reached its full development in Medieval times, and this spirit was the popular spirit. In art pure and simple the Romans had no facility of expression, and they borrowed the clothing of their buildings from the Greeks. It was Greek art, with the art left out.

In this direction, then, we can learn nothing from Rome. The prophet returned an evasive answer when asked, "Can these bones live?"—an Eastern habit, probably constitutional with him. We need be guilty of no evasion. Roman detail expresses nothing; and I am afraid it is, for that reason, only too serviceable—when you have nothing to express. From the decline and fall of Rome we may seek warning, but not inspiration. The life of Rome, which has given us her great laws, lay in her people, and it was to the fulfilment of the popular life that we owe the legacy bequeathed to architectural style, for her baths, public buildings, and halls of justice provide us with plans upon which the architecture of our own time is modelled.

An agreement had taken place, as I have said, in ancient buildings, as to the fittest expression of certain paramount ideas. But on turning to the succeeding periods we find no such agreement. The individual, and not the collective perception, is supreme, and such perceptiveness is formed of such infinite variety that we can only recognise it as the element known as individuality or *caprice*. Such a characteristic was unknown to older civilisations, where despotism ordained and coloured everything, as in Egypt, Assyria, and even Greece. The flexibility of Greek ideas, so evident in all they touched, never bent themselves to the claims of the individual. The Republic of Plato leaves him out in the cold, since his intrusion,—possibly unwashed and unclothed,—into a society which was to be of such unblemished respectability, that had its members been other than Greeks it must have been most unmitigatingly dull, could not be entertained by even the most advanced

philosophy. Yet this sentiment doubtless saved her artists and kept them pure. Their life was in the workshop; they were regarded as tradesmen, and society left them unspoiled by its follies.

It was the little band dwelling amongst the Lagoons of the Adriatic, whom King Pepin tried to drive into the sea, and who afterwards became the great Venetian Republic, that set the true note from which Mediæval art sprung. By her sea trade with Byzantine she became a repository of such arts as had descended from Athens and Rome, and under this influence built the most notable Western building of that time. How is criticism to help us here, where precedent is derided, and where the interests of common life on sea and land, usurp the sovereingty of ideas—in this changed state from law to caprice—from what is by nature communicable to what is by nature incommunicable? It is here that related knowledge becomes so serviceable. It enables us to look round and behind the capricious element, to catch it by the difference of treatment, perhaps, in architecture and poetry, but especially by an understanding of the life that lay at the back of that which is interesting us, the life of the man and of the moment. By this means we may augment the volume of the song as the body of a viol augments the vibrations of the strings.

And this brings us very near the "Poetry of Architecture." The Italian cottage, with its white walls cresting the olive terraces, bosomed in grey and domed in blue, is indivisibly one with its scene. And were time able to touch it in its seclusion, as it touches the busier homes of men, it would in like manner belong to its time also. It is in this way that we may regard the creations of bygone days, and so augment the impression they make upon us. The tower of the Signori at Florence rears itself the straighter and dominates us with a sense of gathered power, when we hear the clash of its bell calling the citizens to arms, while its echo is answered by the hurry of feet and murmur of voices from the thronging piazza beneath. Or to speak of presences which are nearer to us, and which, as they keep audible silence in the midst of a city's cries, may tell us the eager story of their lives if we will stay and listen awhile. Our cathedrals tell us of days when they formed a shelter to the people who dwelt at the foot of their high walls, a hospitality shared with the homestead itself. For folks did not lead two lives. The kindly gossiping monk went in and out of their doors carrying with him the common interests of the day along with creed and benison.

The records of the religious or social guilds, for we are unable to distinguish a difference, describe this life for us. To such a guild, dedicated to one or more saints, all were admissible, man and woman, priest and layman, so long as he or she be of good report. Provision for decent burial with candles and night watches, feasts, services, and processions on guild days, once, twice, or thrice in the year as might be, ministered to the devotional element. The relief of the poor, loans on surety, even free loans to assist the young to obtain work, dowries to good girls of the guild, assistance to brethren imprisoned, hospitals for poor strangers, free schools, these and many more kindly and social works did these guilds undertake.

I cannot refrain from quoting to you a portion of the ordinance from the return or deed of the Guild of St. Christopher, Norwich, of the fourteenth century. It opens with a prayer for the Holy Church, for peace, pope, cardinals, patriarch, Holy Land, archbishops, bishops, parsons, king, queen, dukes, earls, barons, bachelors, knights, squires, citizens, burgesses, franklins, and continues on behalf of all true tillers and men of craft, widows, maidens, wives, and for all the commonalty and christian people; for all true shipmen and true pilgrims that they may safely come and go; for the fruits of the land and of the sea; for brothers and sisters of the guild, and all christian souls, amen. One beholds the same social unity in the Canterbury Pilgrimage. We have the same folk that have just been remembered in prayer. The friar, the nun, the poor parson, the knight, the shipman, the yeoman riding together merrily and unreservedly.

It was from the hands of the true craftsman prayed for, conjointly with bishops and prelates, that our great churches have grown. With this binding together of all classes, one is not surprised at a great unified type of architecture springing up, nor a spirit of gentleness and devotion one with the lives and homes of the true craftsman, manifesting itself in a devotional and homely manner upon the graceful detail. Thus we find the quaint and grotesque carved on boss and corbel, and a delightful innocence and freedom displayed in the intersection of mouldings, while the cresting pinnacle. with its eager clambering leaves, from beneath which laughs some elfish countenance, tells the delight of the conquering hand that raised it. In this spirit may the critic linger in our cathedrals. He must not tell us that these pinnacles are the prototype of the flag-staffs which Egypt lashed to her Pylons. It may be a fact, but it is a fact that bears not a ray of expression upon its face. Gothic architecture rather wears, like Wordsworth's mistress, "a countenance in which did meet sweet records, promises as sweet." And one is veritably nearer to its spirit in verse than in anything else.

We have, in conclusion, the second value of criticism to consider—that it has the power to create new and fresh ideas, to furnish an atmosphere when our surrounding conditions are against us, in which we can best work. I will not go so far as does a modern author, who declares that everything that concerns us in the present is inconvertible into art, and that it is precisely because Hecuba was nothing to anybody, that she forms so suitable a centre for tragic *motif*. On the other hand, the statue of an heroic policeman lately erected in Chicago, which suggests to us more than anything our old friend demanding who stole the sausages, may well, if I may borrow the descriptive transatlantic language, take the cake as an experiment in modern inspiration. Yet beneath the hideous veneer of modern life the passions surely are there which created and moved through Greek drama, and which Shakespere worked into his material. But while we have to mine for them, these ideas and passions were then in the air. "Listen," quoth a modern seer—"there never was an artistic age." Truly not. A shipman upon the Piræus knew no more about art than did Queen Elizabeth's turnspit, nor either of them more than a sixth standard schoolboy to-day. But they knew more of the passions and ideas out of which art is made. So far, then, Mr. Oscar Wilde is right. We must turn to days such as these for inspiration, for we shall not find it in the interests which surround us. In saying this, I do not propose, like Mr. Gilbert's hero, "to be eloquent in praise of the very dull old days that have long since passed away." Every man belongs to his time. But I would urge that we cannot expect to have our cake and eat it. We cannot hope to be famous for everything, and just now we are famous for commercialism and common sense, both inimical to art. By common sense, let me explain that I mean what Mr. Ruskin doubtless does, when he declares it to be no sense at all, a condition of mind which is chiefly remarkable by an inability to see the incongruous, whereas to coax congruities out of incongruities, with just a flavour of the incongruous left on, forms one of the first lessons in art.

Yet if we are to push our craft and carry our mission into the enemy's land, it is most necessary to have some acquaintance with commercial methods. Further, since *function* is an indispensable element in architecture, one indeed which distinguishes it as a so-called useful art from an imitative one, the inarticulate wants of an inarticulate age have to be mastered and marshalled before there is any hope of clothing them with architectural effect. It is function which dictates in the rough the shape of everything as we see it, for instance in a spoon, a pin, or a ship, and function it was which planned a Gothic cathedral and a Greek temple. In contrast to these simple types let us picture to ourselves the function of a modern hall of justice with its cloud of witnesses, its judge, jury, counsellors, and prisoners, with a myriad untold minions of the law, all demanding twice the accommodation they want or expect to get. But they will require some semblance of their wishes being met, and it would be no good presenting them with a design for a basilica, and tell them to fit it up with pens for themselves. To meet what are considered to be modern requirements, an architect must possess no mean organising power. Also we must remember that we are not like the sculptor and the painter who execute their own work. We have to employ others, or get somebody else to employ them, if we would see our creations grow into life, and to get this much done requires all the tact of which we are capable. These faculties cannot be neglected, and yet we must always remember that they are but the servants of our craft, who is our mistress.

We are to-day in an age of transition from one of authority and pedantry towards one where the freedom of the individual largely enters. A hundred years ago, Stuart and Revett's then new book set a fashion which kept its head above water into the first half of the century, when the Gothic revival finally swamped it. There is a fine touch of melancholy about these Stuart buildings, as though erected in memory of an art impossible to revive; and I always think of the architects as very silent gentlemen in black wearing weepers and undermined by grief. They, at least, made little stand against the robust Goths, when prosecuting their second invasion. These brought back with them the old sense of freedom, but marred by eclecticism. They were so horribly afraid of doing what was wrong, that they were always doing it, as is the custom with excessive virtue. The low-pitched roofs of the fifteenth century came off wherever they were found, and the ghostly traces of a high pitch were sought for upon every tower. In us the new spirit of freedom has gained power, and the accumulated reaction against the pedantry of both modern Greek and modern Goth is inclined sometimes, perhaps, to make us break bounds. Therefore, we should not be unmindful of the old Greek restraint, a quality always present in fine art. Caprice without reasonableness appeals only to one part of our nature, and without its restraining power we lose a nice sense of the fitness of things. Laws which we have seen paramount in Greek architecture are paramount to-day, and a musician who cannot evolve a fugue from some given phrase, or a sonata from certain melodies, is very naturally disqualified by his confrères. Happy is the young architect who from rhthym and the development of rhythm early discovers himself to be unable to construct in obedience to the laws that govern these qualities, for the profession of millionaire is still open to him.

This Association possesses unrivalled opportunities for assisting in such a discovery, and it might well include among its parental duties a quorum of fathers who should communicate this advice to their young sons both for his own sake and for that of the craft whose reputation we have in keeping. And for the rest of us, let us familiarise ourselves with such things as are of good report, that our efforts may not be in vain.

An age has never been so full of endeavours as this, that can never bear fruit and come to perfection, and chiefly for want of direction. Happily for us, we had our infant complaints so badly and so universally in the Greek and Gothic movement, that we have no sickness on us to compare with the epidemic of Ibsen and Anglo-French painting. There is, I venture to think, a better all round excellence of work done in architecture than in any of the other arts. Perhaps for this reason there is not that brilliancy and distinction in our work that belongs to individual groups in other lines of creative effort. A modern impulse is distinctly evident in those fields where the poets Arnold and Rossetti and the sculptor, Alfred Stevens left their mark. One could only wish that the painters George Mason and Fred Walker were equally well remembered.

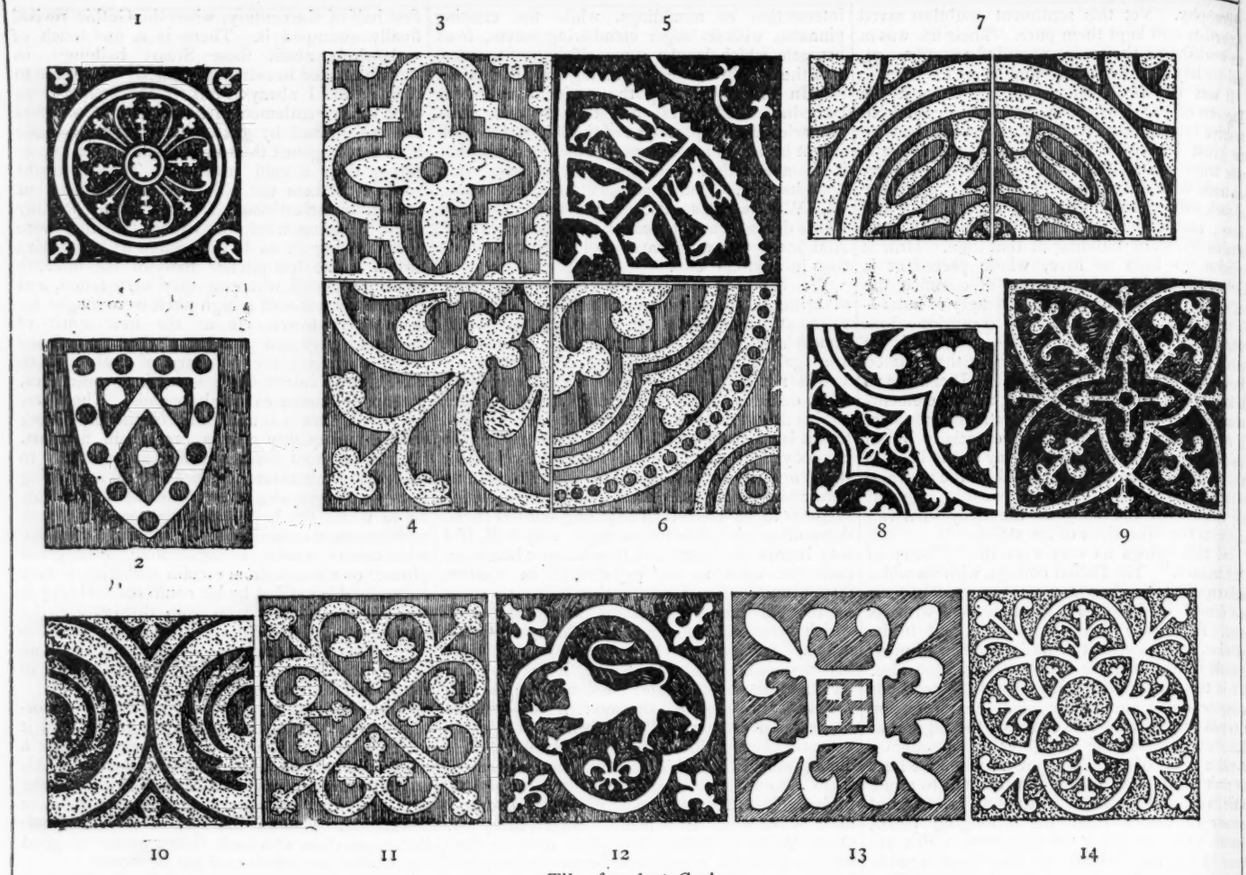
And in architecture we have our influences, for Burges, E. W. Godwin, and Sedding should be no mere names. What I think should be most desired by us is that some common sentiment should invade our work, which would not mean monotony of style, since there would be no agreement as regards expression, wherein, I may remind you, lies the stumbling-block of academies.

It is where two or three are gathered together that enthusiasm burns, and a guild or association of students thus holds latent immense possibilities. Our time is especially for the young, in spite of the anxiety of our parents as to what they shall do with their sons. Well directed effort is no longer decried as innovation. It is towards a right direction of effort that criticism tends, and giving to this quality its due weight, it is for us to go forward.

[A brief discussion followed. We give a few notes of it on another page.]

PROFESSOR AITCHISON'S ROYAL ACADEMY LECTURES.—We are obliged to postpone the fourth lecture till next week, as there is not space available this week to give it in full along with the illustrative diagrams which should accompany it, and we do not wish to divide it.

FETTER-LANE CONGREGATIONAL CHAPEL.—We hear that the Charity Commissioners have made an order for the sale of this chapel, which stands on the lane's western side, close to Norwich-court (*prius* "Magpie-yard") and Barnard's-inn. The existing fabric was built about 150 years ago. Dr. Thomas Goodwin, at one time in high favour with Cromwell, was minister here, according to Mr. Walford's "Old and New London," during the interval 1660-81, having been forced to leave Magdalen College, Oxford, at the Restoration. It has been proposed by the trustees to devote the proceeds of the sale to building a chapel at Leyton, and to establishing a branch in the City.



Tiles found at Goring.

TILES FOUND AT GORING.

INTO the circumstances attending the finding of these tiles there is little object in entering. They were turned up promiscuously during my recent excavations of the site of the Priory of St. Mary, at Goring, in Oxfordshire. By whom this convent of nuns was founded, and under what rule it was established, is a vexed question, owing to the absence of any chartulary of the monastery. Speed says they were Benedictines, while Tanner alleges that they followed the rule of St. Augustine. All the light that I have been able to shed on the subject tends to confirm my opinion that the community was established by Robert Doyley (the second of that name) in the first half of the twelfth century, and that the nuns were of the Austin order.

The tiles, which range in size from 4 in. to 6 in., are excellent specimens of their kind, and the wonder to me is that they were used in the pavement of an establishment worth but £80 a year at the Dissolution, and probably composed of but half-a-dozen nuns at most, even in its palmiest days. Taking them in the order of their numbering, I will endeavour to give some idea of their, to me, very remarkable colouring:—

1. A dark olive-green. Ground pattern, Naples yellow, almost white; in places splashed with raw sienna. A glazed tile. N.B.—This is the only example in which the pattern is laid on, not inserted in the more usual way.
2. Pattern, white. Ground, red. Unglazed. An early form of charging.
3. Pattern, yellow. Ground, red, varied with pattern white. Ground, grey. Unglazed.
4. Pattern, yellow. Ground, porphyry red. Unglazed. Varied with pattern, white. Ground, grey.
5. Pattern, white. Ground, dark grey. Unglazed.
6. Pattern, light and dark yellow in patches. Ground, red, grey, and sometimes black in places. Unglazed.
7. Pattern, Indian yellow. Ground, red. Unglazed.
8. Pattern, Naples yellow, almost white. Ground, red. Unglazed. Varied with pattern, deep Indian yellow. Ground, deep bronze iridescent green. Dull glazed.
9. Pattern, white, splashed with yellow. Ground, grey.
10. Pattern, Indian yellow. Ground, dark-red brown. Dull glazed.
11. Pattern, yellow. Ground, grey and red. Unglazed.
12. Pattern, slightly-tinted green. Ground, sage-green. Unglazed.
13. Pattern, white. Ground, grey. Unglazed.
14. Pattern, a toned white. Ground, dark Indian yellow; an unusual colouring.
15. Pattern, Naples yellow. Ground, brown. Unglazed.
16. Pattern, Indian yellow. Ground, red. Varied with pattern, lemon yellow. Ground, sage-green. Unglazed.
17. Pattern, Indian yellow. Ground, warm raw Sienna yellow. Glazed.
18. Pattern, white. Ground, grey. Unglazed.
19. Pattern, light yellow. Ground, dark myrtle-green. Glazed.
20. Pattern, bright yellow. Ground, red. Unglazed.

In some glazed fragments I picked up of design No. 2 the glaze had turned the red a chocolate colour, and the white to a Sienna or Indian yellow.

As may be seen, some of the tiles form part of a larger pattern, obtained in some cases by the use of eight tiles, while the rest form repeats at intervals, probably mixed with the plain tiles which cumbered the ground in every direction. They mostly belong to the thirteenth century, are about 1 in. thick, and are bevelled to allow of the mortar running well into the joint.

PERCY G. STONE.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

PALMA CATHEDRAL.

THE eighth general meeting of this Institute for the present session was held on Monday evening last at No. 9, Conduit-street, the President, Mr. J. Macvicar Anderson, in the chair.

The minutes of the previous meeting having been taken as read, the Secretary, Mr. William H. White, announced the death of Lord Northbourne, an Honorary Fellow of the Institute.

Nomination of the Royal Gold Medallist for 1893.

The Secretary having read By-Law 64 relating to the award of the Royal Gold Medal,

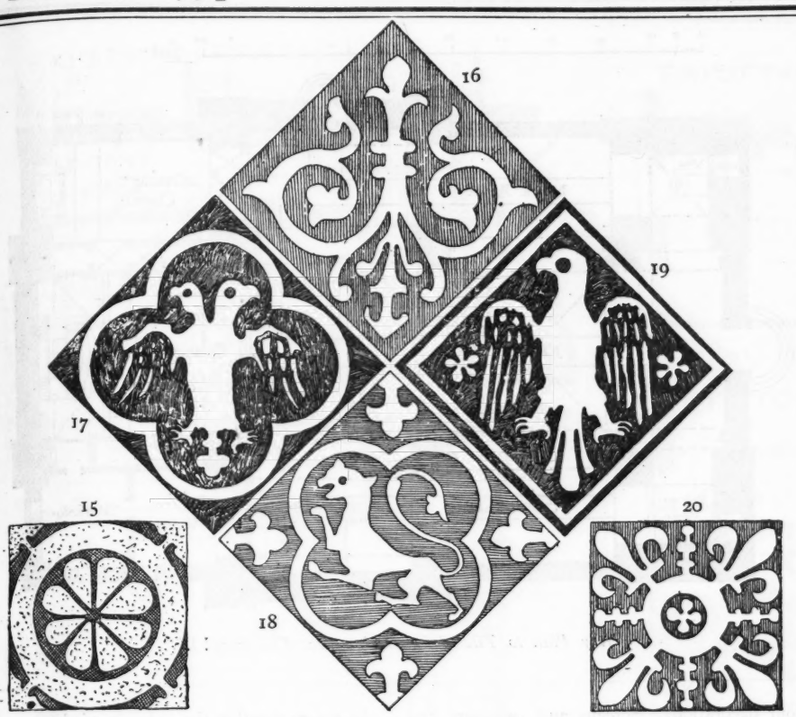
The President said that it was with pleasure that he had to intimate that in accordance with the terms of By-Law 64, the Council had nominated Mr. Richard Morris Hunt, honorary corresponding member of New York and corresponding member of the Institute of France, as the recipient of the Royal Gold Medal for 1893. Mr. Hunt, he need scarcely say, was an architect of culture and eminence in America, and those who knew him personally, as he had the privilege of doing, could testify to his power and individuality. He was quite sure that the name which had been submitted by the Council would be received by the members of the Institute with approval, and that it would be submitted in due course to Her Majesty the Queen. It seemed to him to be a graceful compliment to pay to the Republic over the sea to offer this recognition of the ability of one of her distinguished sons. Mr. Richard Morris Hunt was the architect of the central building of the Chicago Exhibition, a work of enormous magnitude.

In reply to an exceedingly uncalled-for interference on the part of an Associate member, who appeared to be unacquainted with Mr. Hunt's works, and to imagine that others were no better informed than himself, the President said that photographs of some of Mr. Hunt's works were in the Institute. Before the Council arrived at their decision, he obtained from Sir Henry Trueman Wood, the Secretary to the Royal Commission of the Chicago Exhibition, working drawings of Mr. Hunt's great central buildings at the Exhibition, and he (the President) thought that any one who examined those drawings would be satisfied that the honour proposed to be conferred upon Mr. Hunt would be by no means misplaced.

Palma Cathedral.

The President, in calling upon Colonel Lenox Prendergast to read a paper on "The Cathedral of Palma, Majorca, with some notes of buildings in its neighbourhood," said that Colonel Prendergast was, as they all knew, one of their Honorary Associates whom they saw there often, and who in that respect, showed his appreciation of the honour which had been conferred upon him.

Colonel Lenox Prendergast, in his introductory remarks, drew attention to the situation of the Cathedral: it had been the ancient stronghold of the Moors, and on it, the site of their greatest Mosque, stands the Christian church. The church was designed by Don Jayme of Aragon in 1232, after the rescue of Majorca from the Moors, which took place in 1229. The progress of the Moors in refinement and the arts had been hardly less brilliant and rapid than their progress in empire; and the architectural works undertaken by Don Jayme owed much of their delicacy and refinement to them. The enthusiasm of the Majorcans at their deliverance by the King of Aragon found expression by their founding the cathedral church of Palma.



Tiles found at Goring.

Street, in his "Gothic Architecture in Spain," when speaking of Sta. Maria del Mar at Barcelona, claimed Palma Cathedral for its prototype. In the Governor's palace there were traces of Moorish work, especially in the foundations; but of Moorish architecture, as such, he could find none. The west front of the cathedral faced the entrance to the Palace; the upper portion had only recently been completed, and though its design might have been worse, at a distance it did not jar with the rest of the building. The south front was, however, a marvellous creation in Santanny stone, and the effect singular in the extreme. The west door was considered a work of importance. The interior of the church, owing to the formation of the ground and the difference of space separating the arches between the north and south entrances and the remaining arches, appeared considerably larger than it really was. A bishop's throne occupied the centre of the east wall, and above rose the chapel of the Holy Trinity, standing many feet above the floor of the rest of the church. The finest work, architecturally, was that carried out by Bishop Pedro Cima about 1373; to that period also might be assigned the three easternmost bays of the nave; and at that time the effect of the interior of the Cathedral must have been singularly fine as a specimen of Gothic architecture and fittings. Having given certain measurements of the columns, length and width of the church, the height of the central nave and side nave, Colonel Prendergast turned to the question of lighting. To a Spaniard the practice of admitting the sun anywhere was not to be entertained for an instant; but the solution of the strange blocking up of window tracery with stone was, to the author's mind, due to the enormous height of the church, which rendered it necessary to strengthen the supports; although, notwithstanding these precautions, several bays had had to be rebuilt. There was one other solution, viz., where the sun entered in force, battalions of flies followed in its wake; but, whatever the reason, the side-chapels were practically unlighted, and appeared to have been so from the first. Each chapel, of course, contained an altar, and behind the altar-screens were tombs of bishops with carving well worthy of study. Turning to the ground-plan of the Cathedral, the author described the uses to which the building was put, remarking that a knowledge of the purposes for which ancient buildings were erected was necessary if they were to be restored or appreciated. The plan was simple: three full-sized naves or aisles were placed side by side, the centre one having at its eastern extremity the sanctuary which contained the high altar. The choir was situated in the nave, two bays westward of the sanctuary arch, which was the usual Spanish arrangement, to explain which he described in detail the ceremonies of the Good Friday and Easter-Day services in relation to the planning of the building, and pointing out the utility of the various parts of the church, said there could be little doubt that the architects thoroughly understood their business and for what they had to provide. The high altar, consecrated in 1346 by the seventh Bishop of Majorca, was of marble, and above it was a singularly fine "retable" in sculpture, while several niches on each side contained figures of saints, all admirably carved in wood. In the treasury were several *reliquaries* of the best period of the architecture of the church. Of these the author mentioned a few, giving the approximate date of each. Those who had charge of the church never seemed to have relaxed their efforts to obtain what was most fitting, the best artists being apparently always engaged. Referring to the stability of the structure, which had at different periods to undergo a process of reconstruction in several directions, he quoted from a document concerning a commission of architects appointed to examine the mischief going on subsequent to the completion of the building, and gave reliable Spanish authorities for the dates at which every portion of the work was executed. Going beyond the precincts of the Cathedral, towards the head of the harbour, the author described a remarkable building erected as an "Exchange" for the merchants of Palma, on land placed at their disposal in 1232; the building was not completed, however, until the middle of the fifteenth century. It consisted of a rectangular hall divided into three divisions by a double row of spiral columns, three on each side, which supported an arched and vaulted roof. Traceried windows and carved doorways of the fourteenth century combined to exhibit what appeared to him an altogether new experience of Gothic pointed architecture as applied to civil buildings. A month had passed since his arrival before he visited the Lonja, or exchange, and during that period mischief of a serious kind had been done. The authorities had decidcd to renovate the interior. The walls were certainly darkened and stained by age, but there was a tone of colour on the flutes of the spiral columns and ribs of the vaulting which enhanced the effect to such an extent that to scrape off the patina seemed little short of sacrilege. Colonel Prendergast then described the injury which was being done, and quoted a letter written by himself, in which he referred to his membership of the Institute, to Mr. F. W. Mark, the British Consul, and stated that, in consequence of their united efforts, and a local newspaper publishing his letter with a communication in similar terms from the Consul, a strong feeling arose in the city against the work being continued. That reached the ears of the Government at Madrid, who stopped supplies, and before he left he had been gratified to know the scraping had ceased. With reference to the Casa Consistorial, another civil building at Palma, which the letter urged was worthy to be preserved with jealous care, it was, he was told, not to be pulled down, as had been contemplated, to make room for a feeble imitation of the Lonja; but that the roof was to be repaired and the building preserved.

The President, in inviting discussion, said that it was gratifying to find from the paper that Colonel Prendergast had not merely gone to Majorca for the purpose of enjoying a holiday, but that he had been engaged in such an intellectual pursuit as the thorough examination of the ancient buildings of the island; and, further, that his visit had been productive of so much good in bringing about the preservation of the Lonja.

Mr. William White, F.S.A., in proposing a vote of thanks to Colonel Prendergast for his paper, said that, although he had not had an opportunity of visiting the Cathedral of Palma, the building had been brought before him in such a vivid manner by the lecturer that his only wish was that he could go and visit it. It seemed to be a most wonderful building, and the account which had been given of it was made the more interesting by the description which the lecturer had given of the functions which were performed in it.

The President said that they had the pleasure of having with them that night a gentleman, Mr. H. W. Brewer, whose remarkable and beautiful drawings of Majorca they had had the privilege of studying, and he was sure they would all be glad to hear some remarks from him.

Mr. H. W. Brewer said that the drawings referred to were not his, but were his son's, who had been to Majorca, while he (the speaker) had not. He was, therefore, only able to judge of Palma and its cathedral from photographs, drawings, and descriptions, and from conversations which he had had with his son and others. There was one very remarkable feature, it seeme to him, about the treatment of Palma Cathedral. The plan was undoubtedly purely southern, and was like the great Church of Sta. Maria del Mar at Barcelona, which could not possibly be by the same architect, Jayme Fabre. That architect was supposed to have had something to do with the Church of Sta. Maria del Mar, although the late Mr. Street did not seem to be quite certain whether he was the architect or merely the consulting architect. Undoubtedly he was the architect of the great cathedral at Barcelona. This architect was called for by the Bishop of Barcelona, because he had built a large Dominican church in Palma, which was supposed to be one of the most wonderful churches ever erected, on account of its great space and the smallness of the supports with which that space was covered. Its size, however, was small compared with that of the enormous cathedral at Palma, which, he presumed, was not built at that time, or, at any rate, not completed. It was astonishing to think of a cathedral with a span of about 65 ft., with aisles about 30 ft.; the whole, with chapels, making a width of about 200 ft. One was not surprised at what Colonel Prendergast had told them about the very serious disturbances which had taken place at the building, and that some of the arches had fallen down. But the cathedral must be pretty firm, for when the very serious earthquake took place in Palma about two years ago,—at the time of the earthquake disturbances in the Riviera,—it merely succeeded in cracking one of the arches of the tower. If the cathedral could endure such a shock as that, it was to be hoped that it would not succumb to misfortunes which had befallen other cathedrals. He should like to refer to the peculiarity of the large blocked-up tracery windows which Colonel Prendergast had mentioned. He thought that they indicated a Northern origin or a Northern influence about the details. It was not likely that an architect working in the South, where he wanted, perhaps, to build a church, would invent large tracery windows, and it seemed to him as though the architect had some German notions in his head. He could not help seeing, in many respects, a great similarity between the cathedral at Palma and some of the great churches on the Baltic. Those very lofty, perfectly plain, octagonal columns, without any shafts attached to them, which were found in Palma Cathedral, were to be found also in the Church of St. Mary, Lubeck, and many other churches in Germany. It was by no means impossible that Don Jayme as we called him, was a German of the name of Faber, or possibly he may have descended from a German family. But at any rate there was a singular German look about the details of the building, which seemed a little incongruous, although they had been splendidly blended with the Southern plan. Of course

we found exactly the same thing at Milan, where we knew German architects were employed. The German architects, it seemed to him, adopted the great Southern plan and welded in with it their German detail. Moreover, illustrations of churches in the island of Cyprus, which he had seen, showed the same peculiarities. The whole point was one of very great interest, because, as Colonel Prendergast had shown, the Cathedral of Palma seemed to have had nothing exactly like it which had gone before it to lead to the kind of development of architecture which they saw there, and that rather led one to suppose that the general plan of the building might have been adopted from Spain, but that the pure and very beautiful and simple detail which was to be seen there, might somehow or other have found ts way from some part of Germany,—probably from the north. At any rate, it was one of the most noble and interesting buildings in Europe.

Mr. Octavius Hansard, in seconding the vote of thanks to Colonel Prendergast, said that, as a body interested in the preservation of ancient monuments, they ought to specially thank that gentleman for the action which he had taken in preventing the destruction of such an interesting building as the Lonja.

Mr. W. H. J. Weale said he wished to point out that between the Netherlands and Majorca, both in the fourteenth and the fifteenth centuries, there was considerable inter-communication. He had very little doubt that just as on the mainland in Spain the art of the Netherlands had a very great influence, so also the architecture of the Netherlands might have influenced the details in the Cathedral of Palma.

The President, in putting the vote of thanks to the meeting, said that they felt very grateful to Colonel Prendergast for the steps he had so successfully taken for the preservation of the Lonja.

The vote of thanks having been agreed to, Colonel Prendergast briefly replied, and the meeting terminated.

Illustrations.

REREDOS, COLYFORD CHURCH, DEVON.

THIS reredos, designed by Messrs. Tait & Harvey, Exeter, and executed by Messrs. Luscombe, Exeter, has lately been placed in this church. It is of oak, and the central panel is after the well-known pietà of Fra Bartolommeo, carved from a cartoon made by Mr. C. J. Tait, the author of the able paper read at the last meeting of the Architectural Association, and published in our present issue.

PULPIT, ST. MATTHEW'S CHURCH, EXETER.

THE chancel of this church was completed last year, and this pulpit was at the same time given. It is of Corsehill stone and green Irish marble. The architects for the completion were Messrs. Tait & Harvey, and Messrs. Luscombe were the contractors and the sculptors of the pulpit.

BISHOP'S THRONE, ST. MARK'S CHURCH, TORQUAY.

THIS throne, with sedilia, altar, and reredos, and furniture of a new morning chapel in south aisle, were among additions recently made to the above church. They were designed by Messrs. Tait & Harvey,* and the carving executed by Mr. Hems, Exeter.

DESIGN FOR EAST END OF A CHURCH.

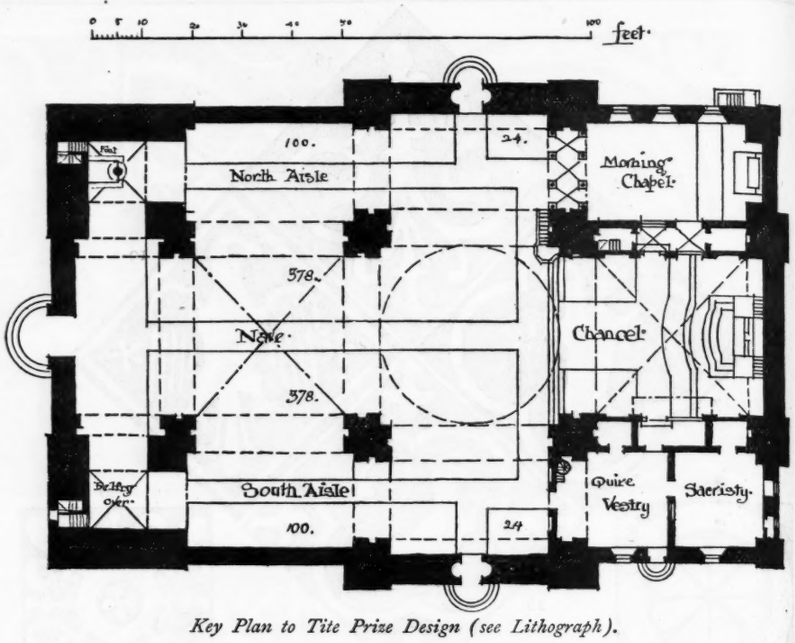
THIS was the subject given this year by the Institute of Architects in competition for the Tite prize, the object of which, as most of our readers are aware, is to promote the study of the Italian style of architecture.

The design which we publish, by Mr. C. A. Nicholson, is the one to which the prize was awarded. In explanation of his design, Mr. Nicholson writes :—

"The subject of the design was an 'east end' and organ. The general scheme of the church was a parallellogram, with central lantern covered by a timber dome, and with two small bell turrets at the west end. The materials intended were Doulting or other similar stone for the main architectural features of the building, and for the exterior facing. The roofs of oak, leaded. The vaulting and interior wall surfaces plastered for colour decoration. Screens and pavement and reredos of coloured marbles; stalls and organ-case in walnut.

The imagery of the organ case is designed to illustrate Ps. civ.; the pipes would be of bright metal, and the 'swell' box is planned to form a feature in the general design."

* The firm was at the time under the style of "Fulford, Tait, & Harvey," as given on the inscription in the corner of the illustration; Mr. Fulford has since retired.



Key Plan to Tite Prize Design (see Lithograph).

EXTENSION OF PREMISES FOR THE *MORNING POST*.

THIS building, which stands on the site formerly occupied by the *Field* and *Queen* offices, at the corner of Wellington-street and the Strand, is an extension of the existing premises of the *Morning Post*—the old portion being shown on the left-hand side of the view—and will, when completed, more than double the area of the whole.

The intention has been to carry on the lines of the old building to such an extent as to make it apparent that it is all one building and in one occupation, the upper part of the walls being faced with red brick to correspond with the old, but in the new building Portland stone has been substituted in all cases for stucco.

Accommodation will be provided on the ground-floor for the advertisement and cashier's department, at present very inadequately housed on the opposite side of the street; on the first-floor for the manager, editor's and sub-editor's rooms; on the second-floor for other members of the editorial staff; on the third-floor for the caretaker; and on the fourth-floor for an extension of the present composing-room, readers' rooms, &c.

In the basement will be the machine-room, to be fitted with three new machines now being constructed, each capable of turning out 24,000 copies an hour. In the basement will also be placed the new boiler and engine for driving the machines.

The corridors on upper floors have been so arranged as to afford continuous communication with the old building on every floor, but the openings are in all cases fitted with double iron doors to prevent any danger from fire, and the whole of the new building has been constructed of fire-resisting materials,—the floors being on Fawcett's system and the partitions of concrete and iron.

The building has been slightly varied in execution since the view was made, notably in regard to the main entrance and the turret at the angle.

The general contractor for the whole of the work has been Mr. D. Charteris, Mr. J. Snook acting as clerk of the works, and the architect, Mr. H. O. Cresswell.

NEW ROOM, CROM CASTLE.

THIS room was built in 1890; it is at the first floor level on the north side of the quadrangle of the castle, and has replaced several smaller apartments which previously occupied that position. The entrance to the quadrangle is by an archway under the centre of the room.

As far as possible the existing windows were retained, others being added where necessary.

The doors shown at the end of the room on either side of the fireplace open into a corridor communicating with the principal apartments; at the opposite end there is a fireplace, and doors to lavatory, &c., and servants' staircase. A recessed bay at west end of south side has windows looking into quadrangle.

The room is covered with a truss-rafftered roof plastered on the under side with moulded ribs and carved pateræ fixed on. The floor is of pitch pine in narrow widths and the moulded joiners' work in oak.

Several slight alterations were made in carrying out the work, and two old marble and oak fireplaces were used in lieu of that shown in sketch.

Crom Castle, in County Fermanagh, Ireland, is the seat of Lord Erne, for whom the plans for these additions were prepared by Mr. Thomas Garratt, architect, of London, the structural part of the work being executed by the estate workmen, and the oak work, ceiling, and decorations generally by Mr. F. Müntzer, of London.

INTERIOR OF HALL AND BALL-ROOM.

THIS is a sketch, with a plan, of an interior of a hall for a large house, by Mr. J. Armstrong Stenhouse. It formed one of the exhibits in the Architectural Room at the Royal Academy last year.

PART OF SECOND COURT, ST. JOHN'S COLLEGE, CAMBRIDGE.

THIS illustration is reproduced from an etching by Mr. W. H. Thorp, which was exhibited at last year's Royal Academy. Mr. Thorp writes :—

"The original sketch was made in pencil in 1885, and I transferred it to the copperplate a year or two ago.

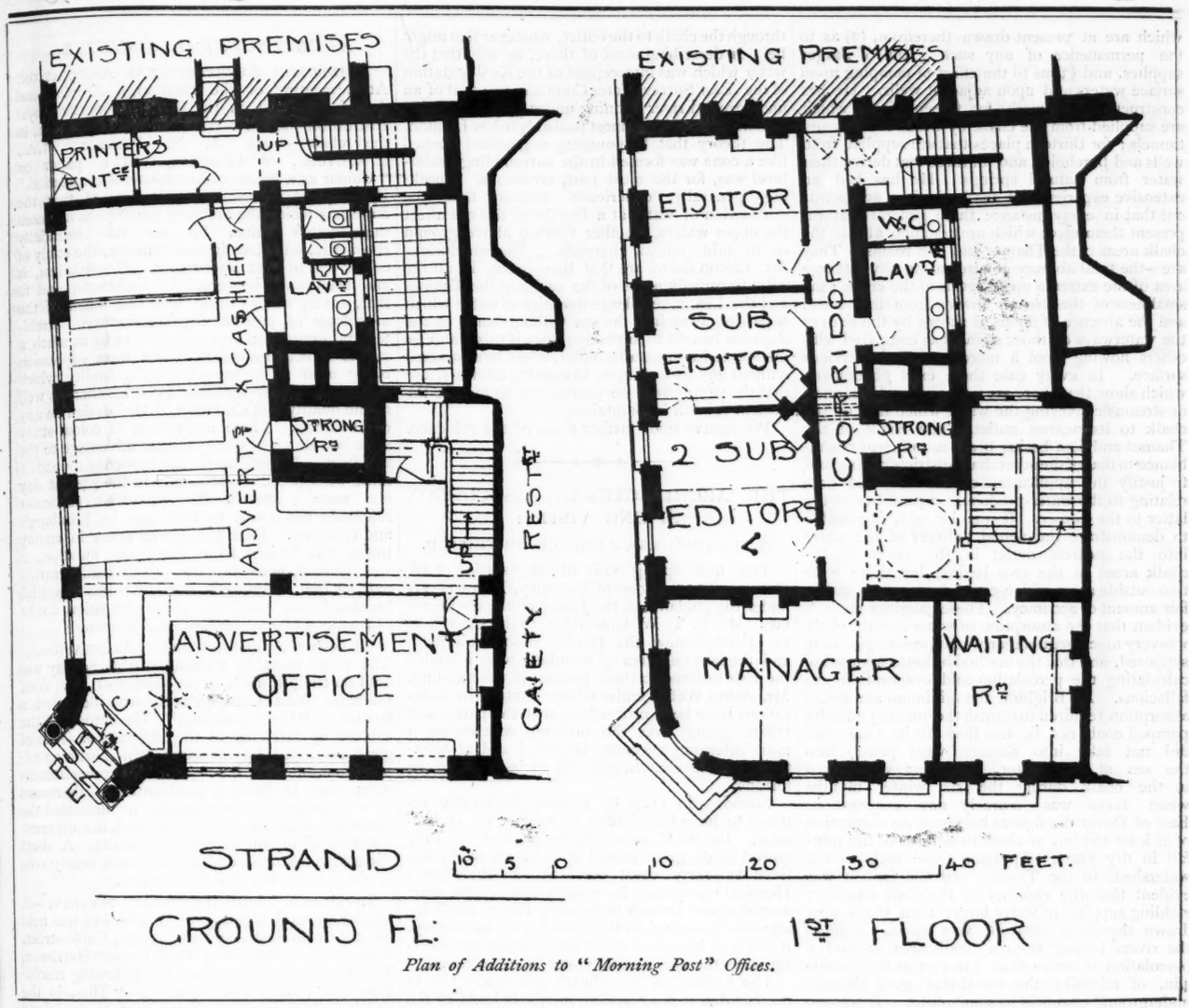
The subject of the sketch is the central feature of the west side of the third court of St. John's, and is noteworthy for its picturesque architectural composition. A cloistered arcade, a survival of an earlier disposition of plan, is carried across this end of the court, and above it are rooms occupied by the students.

An archway in the south-west angle gives access to the college walks and garden, reached by crossing a three-arched bridge of antique appearance.

The library on the north side of the court was completed in the year 1624. The western side, however, is later in date, and was added towards the latter part of the century.

Local tradition attributes the work to Sir Christopher Wren, but probably without any trustworthy evidence to support it."

ERRATUM.—The illustration of part of the large window in Bath Abbey Church was, by a clerical error, mentioned in the text as "west window;" it should of course have been "east," as given on the title of the plate.



Plan of Additions to "Morning Post" Offices.

THE ARCHITECTURAL ASSOCIATION.

THE eighth ordinary meeting of this Association was held on Friday, the 10th inst., in the meeting room of the Royal Institute of British Architects, Mr. H. O. Cresswell, President, in the chair.

Mr. F. T. W. Goldsmith, hon. sec., read the minutes of the previous meeting, which were confirmed.

Mr. H. F. Waring and Mr. T. H. Bell were elected members of the Association, and two other gentlemen were nominated for election.

The President announced that the Association had received a very liberal donation from the Clothworkers' Company, viz., 50*l*. The Company had been informed by Mr. Wyatt Papworth of the good work which the Association was doing, so, in moving a vote of thanks to the Company, he (the President) desired to include in it the name of Mr. Papworth.

The vote of thanks was carried by acclamation.

Mr. C. J. Tait, A.R.I.B.A., of Exeter, then read a paper on "The Value of Criticism." We print the paper *in extenso* elsewhere.

In the discussion which followed,

Mr. Leonard Stokes, in proposing a vote of thanks to Mr. Tait, said that the paper was so able and covered such an extent of ground that its discussion was attended with some difficulty. He was not quite sure that he understood Mr. Tait as saying that there were only two styles of architecture, and that Greek was the best.

Mr. Tait explained that he did not mean to say that Greek was better than Gothic. What he did mean to say was that Gothic architecture could not be described in the same manner as Greek architecture. The strong point of Gothic architecture was its individuality,—the marks which it bore of the touch of the the individual craftsman. But the charm of Gothic was very difficult to describe, as there were so many elements in it which were difficult to trace.

Mr. Stokes said he was obliged to Mr. Tait for his explanation, and he was glad to hear that Mr. Tait had not meant to cry down Gothic art on account of its individuality, because he thought that we ought to try to develope individuality in our modern architecture. Although he was quite prepared to admire Greek architecture, and did admire it, it depended upon certain more or less rigid rules, and he could not think that the highest form of art was that which was bound down by rules, such as that the height of a column must be equal to a certain number of its diameters. In his view, such a system of rules could not lead to such good results as when the architect had a free hand and could build to satisfy the eye,—the eye, of course, of a trained man. Although no doubt the proportions of the Greek temples were very beautiful, they were only so, as it appeared to him, from their adaptation to the end which the builders had in view. No doubt the Greek temples would have been very different if they had been built to meet other conditions, and it was quite likely that satisfactory results would have been obtained by their builders, for he thought that after all the rules of Greek architecture were more elastic than they were generally supposed to be. But on the whole he was strongly of opinion that the less a man was trammelled by rules the better work would he produce. One important lesson to be learnt from Greek architecture was the quality of restraint or reserve in ornament, for he thought that perhaps the greatest fault of our modern work was that we put too much ornament on our buildings, and paid too little attention to repose and breadth of effect.

Mr. E. W. Mountford said he had much pleasure in seconding the vote of thanks to Mr. Tait for his admirable paper. He (the speaker) more or less agreed with everything that Mr. Tait had said, and he admired his courage in contending against the most recent ideas as to the unity of the arts. He quite agreed with what had been said as to the necessity of restraint in our modern work, but it was his opinion that restraint only came with experience. The tendency was for the young architect, when erecting his first building, to put all he knew into it; as he went on in his career he took out more and more, or rather put in less and less, and his last buildings were better than his first ones. There was no doubt whatever in his mind that more buildings had been spoilt by over-elaboration of detail than by any other method by which they could be spoilt.

Mr. A. O. Collard, Mr. T. E. Pryce, and Mr. F. T. W. Goldsmith supported the vote of thanks to Mr. Tait, and the President, in putting the motion, expressed his sense of the great kindness which Mr. Tait had shown in coming up from Exeter to read so very admirable a paper to them.

The vote of thanks having been agreed to, and Mr. Tait having replied to some points raised during the discussion, the meeting terminated.

THE ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.

THE Commissioners have this week held their last sittings for the taking of evidence.* In addition to further analyses of water as delivered by the companies and additional statistics, from the Registrar-General's department, evidence has been adduced as to the capacity of the Lea basin to afford additional supplies of water. The Commissioners have also continued the investigation, initiated by themselves, into the feasibility of utilising the water from the chalk that is escaping into the Thames and the sea below the district of the Kent Waterworks Company. On this project statements had been made by Mr. W. Whitaker and Mr. W. Topley, and also by Mr. Edward Easton, whose evidence has been taken this week.

Mr. Easton had been requested to give information (1) as to the capacity of the chalk strata in the watersheds of the Thames and the Lea for yielding supplies of water larger than those

* For previous reports of the evidence given before this Commission, see the last two volumes of the *Builder*, as per references given in footnote on page 518 of the number for December 31, 1892; see also page 93, *ante*.

which are at present drawn therefrom, (2) as to the permanence of any such yield of larger supplies, and (3) as to the effect of pumping upon surface waters and upon adjacent wells. He has constructed waterworks for fifteen places which are supplied from the chalk by means of wells and tunnels; for thirteen places that are supplied from wells and boreholes, and for three that derive their water from natural springs. He has had an extensive experience of chalk districts, and points out that in every instance three general features present themselves which are common also to the chalk areas of the Thames and Lea basins. They are—the total absence of streams on a very large area of the extreme upper levels of the chalk; the smallness of the streams flowing from that area; and the absence of floods as shown by the sizes of the waterways of those streams as compared with others flowing from a more or less impervious surface. In every case there exist phenomena which show that there are underground channels or streams conveying the water which falls on the chalk to its nearest outlet. The chalk of the Thames and Lea basins bears a sufficient resemblance to that of the other chalk districts of England to justify the application of the facts and data relating to the water-producing capabilities of the latter to the former. It was, he said, impossible to demonstrate the actual delivery of the water into the nearest outlet in the cases of the chalk areas in the two basins, but there were two outside areas which could be gauged with a fair amount of accuracy. These gaugings made it evident that the absorption of water into the chalk was very much greater than was at present generally supposed, and that the method hitherto adopted of calculating the percolation and evaporation was fallacious. At Brighton the minimum amount of absorption required to furnish the quantity actually pumped could not be less than 10 in.; and that did not take into account what passed into the sea at low water, nor what was stored in the chalk during the six winter months when there was scarcely any evaporation. East of Dover the figures indicated an absorption of at least 16½ in., or about two-thirds of the rainfall in dry years. Applying these facts to the watersheds of the Thames and the Lea, it was evident that the capacity of the chalk strata for yielding supplies of water larger than those now drawn therefrom must be very great. None of the rivers issuing from a chalk area showed a percolation of more than 3 in., or at the outside 4 in. of rainfall; the remainder gets through underground channels to some outlet. It was not easy to define that outlet in the case of the chalk areas above London, but to the north and east of London there were plain evidences of a flow direct into the bed of the river Thames. The hydrostatic level or gradient in the chalk invariably sloped towards the river. On the north side its highest point was along a line drawn from a little north of Stevenage to a few miles south of Bury St. Edmunds. On the south the line runs from Down, in Kent, passes two miles north of Maidstone, thence north of Charing to the head of the Elham valley, and continues on about four miles north of Dover to within three or four miles of Deal. The water in all this area gravitated towards the tidal Thames, *i.e.*, towards the sea. At Gravesend and Northfleet the fresh water could be seen flowing out of the chalk base at mean tide level. Wells and borings on both sides of the river indicated a larger flow underground. At Grays large supplies were pumped by the South Essex Water Company. The Thames Paper Company pumped 1,500,000 gallons daily without lowering the water more than a few inches. From numerous wells and borings at Northfleet, Dartford, and other places large quantities were pumped which would otherwise flow to waste. These facts answered the first of the three questions as to the capacity of the chalk strata.

As to the permanance of the supply, Mr. Easton said that as long as the rainfall of this part of England remained as it was and had been for probably many centuries, there was no reason to doubt the recurrence of the phenomena which rendered the chalk the most trustworthy and certain source of supply. Diagrams relating to the Kenley pumping station of the East Surrey Water Company, and the Addington station of the Croydon Corporation, were corroborated by diagrams from Brighton and Wisbech, and all went to prove the probable permanence of any supply that might be obtained.

The question of the effect of pumping this extra quantity of water upon the surface waters and adjacent wells was a more difficult one to answer. It was necessary to determine the different ways in which water was conveyed through the chalk to the outlet, whatever that might be. In describing some of these, he said that the water which was intercepted at the Kenley station of the East Surrey Water Company was that of an underground river running under pressure having its outfall at sea level, most probably below London. The theory that by pumping a gradient shaped like a cone was formed in the surrounding water-level was, for the most part, erroneous. Speaking generally, experience showed that the abstraction of water at a low level did not affect the upper waters, whether flowing above ground or in subterranean channels. The conclusions Mr. Easton draws are that there exist, in all the subsidiary chalk areas of the basins of the Thames and the Lea, a very large quantity of water which is passing away into the sea without being of the slightest benefit to anybody; that if this water be intercepted at or near its outlet, it can be abstracted without any fear of injury to existing interests, and that the supply will be permanent so long as the present rainfall is maintained.

We reserve some further notes of the evidence.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

ST. BARTHOLOMEW'S CHURCH, SMITHFIELD.

THE first spring visit of the session took place on the afternoon of Saturday, February 11, under the guidance of the Junior Honorary Secretary, Mr. F. T. W. Goldsmith, to the Church of St. Bartholomew the Great, West Smithfield, and the large number of members who attended the visit testified to their interest in the building. Mr. Aston Webb, under whose control the restorations have been proceeding, met the party, and before going over the building contributed a most interesng account, historical and architectural, of the church, and the vicissitudes of its fortune.

Founded in 1123 by Rahere, commonly reputed to have been either a jester or an ecclesiastic. He fell ill on a pilgrimage, and not only vowed to do great things upon his recovery, but lived to carry them out. St. Bartholomew's Hospital also began its existence under the same auspices, and though in its early life a small institution compared to the church and monastery, it has now become a much more important institution in the eyes of the public than the church.

The interest of the church principally lies in the fact that it is a remnant, unique in itself, of the churches in the City prior to the fire of London. All that remains of this once extensive Priory of Canons Regular of St. Austin is the chancel of the church, which was retained for the use of the parish when destruction overtook the rest of the monastic buildings after the dissolution of the monasteries in the reign of King Henry VIII. Since that time the history of the building has been unusual, and to base uses parts of this church have been put.

The transepts are now nearly complete, and the dividing wall of the north transept will shortly be removed, with the exception of the memorial screen. This portion of the church will be used as a morning chapel. The elevations of the north transept and of the west end, which have been illustrated in this journal, are treated with flint and stone diaper, giving a pleasing variety to the building. Figures in stone of St. Bartholomew and Rahere over the north and west doorways are the able work of Mr. Frith. The monuments, in which the church is unusually rich, add an additional interest to this unique building.

COMPETITIONS.

COUNTY ASYLUM, ISLE OF WIGHT. — This competition was limited to sixteen architects invited by the committee of visitors, and Mr. C. H. Howell, of 3, Lancaster-place, was appointed the assessor. His award, which the committee will submit for the approval of the County Council next month, gives the first place to design marked "Stet," by Mr. G. T. Hine, of 35, Parliament-street, S.W.; second, a premium of 50*l.*, to "Y Z," by Messrs. Giles, Gough, & Trollope, Craven-street, W.C.; third, a premium of 30*l.*, to "Luna," by Mr. B. S. Jacobs, of Hull; and fourth, a premium of 20*l.*, to "Q. E. D." by Mr. R. Stark Wilkinson, 14, Furnival's-inn, E.C. The asylum is designed to accommodate 280 patients, including a separate block for 30 private patients, and administrative buildings for 380 patients. It is to be erected on an elevated site near Blackwater, and about two miles and a half from Newport.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION. At a meeting of the Edinburgh Architectural Association held on the 8th inst. in the Royal Institution—Mr. W. W. Robertson, President, in the chair — Mr. A. N. Paterson, M.A., A.R.I.B.A., of Glasgow, read a paper on "Colour as a Means of Architectural Expression." By way of introduction, he stated that the materials which the architect employs having each their colour value, his art was essentially chromatic, and that, in consequence, the study of colour was of first importance. Nevertheless, it had been much neglected by architects, and to that, among other causes, was due much of the monotony of present day architecture. Architectural expression was regarded to be as much a matter of colour as of form, the term expression being used to indicate the individuality which differentiated one building from another, as well as the quality and character of the design in any one building. Three main lines of colour-study were laid down as being of most advantage to the architect. In conclusion, the tendency towards a more widespread use of colour in the present day was noted; and in this connection particular reference was made to buildings in Edinburgh and Glasgow. Even if a colour effect in smoky towns was limited to a few years' duration, it was, he said, none the less worth being carried out, for that beauty was none the less beautiful because it was transient. After discussion, a vote of thanks was accorded to Mr. Paterson.

GLASGOW ARCHITECTURAL ASSOCIATION. The usual monthly meeting of this Society was held on the 7th inst., in the studio of Mr. Wm. Guthrie, West George-street, who delivered a lecture on "Glass Staining." He introduced the subject by referring to the different varieties of glass employed by the glass stainer, with an explanation of their qualities and appropriateness when used in different combinations. By means of a large number of examples he illustrated the practical execution of the work and the different methods of obtaining effective results. A short discussion followed, and at the close a hearty vote of thanks was awarded the lecturer.

LIVERPOOL ARCHITECTURAL SOCIETY.—A special general meeting of this Society was held on the 13th inst., at the Library, Cable-street, Liverpool, the President, Mr. T. Harnett Harrisson, F.R.I.B.A., in the chair. The following resolution was passed unanimously:—"That, in the opinion of this meeting, there is great need for a School of Architecture in Liverpool; that the work would be best carried out by University College, who should appoint a practical architect as lecturer, capable of efficiently teaching all the subjects required for the qualifying examinations of the Royal Institute of British Architects; and that the Council of this Society be authorised to take such steps as may be necessary to bring about the accomplishment of this object."

MR. IRWIN C. WALLAS, late of Kilburn and Hinde-street, has, we hear, accepted the management of the English branch of the business of Mr. H. Heim, warming, ventilating, and sanitary engineer, of Vienna and Oxford-street.

LIVERPOOL ENGINEERING SOCIETY.—The eighth ordinary meeting of the present session of the Liverpool Engineering Society was held on the 8th inst., in the Royal Institution, Colquitt-street, Mr. R. E. Johnston presiding. The premium of the Society for the eighteenth session, consisting of books to the value of 10*l.*, was awarded to Mr. Ivan C. Barling, for his paper on "Sounding Apparatus." A paper on "Automatic Sprinklers" was read by Mr. Jas. Henry Lynde, M.Inst.C.E., who, after describing the general arrangement of sprinkler installations, and the construction of the "Grinnell," "Witter," and "Titan" sprinklers, proceeded to demonstrate the properties of sensitive solder, and ended with a short review of the results that have been attained by the adoption of automatic sprinklers.

"A. A." LYRIC CLUB.—A Cinderella Dance was given by this club at the Portman Rooms on Wednesday last, February 8, under the presidency of Mr. E. A. Rüntz, at which 295 members and their friends were present. The specially designed tickets and programmes were made an artistic feature, and there was an exhibition of the designs submitted for a club-badge, of which that of Mr. R. D. Warry was awarded the prize by the assessor, Mr. Walter Crane.

APPARATUS FOR INDICATING WATERLEVEL IN TANKS, &C. — At the Suffolk County Asylum at Melton arrangements have been made for the instalment of Jennings & Brewer's Electro-Mechanical Apparatus to indicate and record in the engine-house of the pumping-station the variations at every inch in level of the water in the tower tank.

LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Tenders.—Tenders were received for an extension of the Holloway to Hackney storm relief sewer. The list will be found on another page under the heading of "Tenders."

Technical Education.—The remainder of the sitting was almost entirely taken up by further discussion of the report and recommendations of the Special Committee on Technical Education. We gave this report, nearly *in extenso*, in our last. The first two recommendations of the Committee were agreed to as amended, last week, as we then reported.

On Recommendation 3, which was as follows :—

(3) "That the Technical Education Board should be appointed for a term of three years, and should consist for the present of not more than *thirty-five* members, of whom *twenty* should be members of the Council; that in the first instance the following bodies should be requested to nominate representatives for appointment by the Council, *viz.*, the London School Board *five*, the City and Guilds Institute *three*, the Governing Body of the City Parochial Charities *two*, the Head Masters' Association, the National Union of Teachers, and the London Trades Council *one* each; and that other members, not exceeding *two*, should be selected by the Council from outside its own body."

On the motion of the Hon. Robert Grosvenor, it was agreed to omit the words "for a term of three years" in the first sentence, and to insert *in lieu* thereof the words "annually in the month of March."

Mr. Roberts next moved an amendment reducing the number of representatives of the School Board from five to three, and increasing the number of representatives of the London Trades' Council from one to three. Mr. Roberts said that as a builder he was conversant with the needs of the case. He expressed a very decided opinion that the scheme proposed had too much of the amateur element and of the school about it, and not enough of the workshop, and he therefore thought that there should be more than one skilled artisan on the proposed Board.

Mr. Alderman H. R. Taylor seconded the amendment, which was carried, on a division, by 49 to 41. The recommendation, as amended, was then agreed to.

The next Recommendation :—

(4) "That the Technical Education Board should be directed to present to the Council, in the month of April in each year, a report of its proceedings during the preceding financial year of the Council, together with detailed accounts of all payments out of the funds administered and a complete list of the institutions aided by it; and that interim reports of the progress of its work should be presented to the Council every three months,"

was agreed to without discussion, and the subsequent recommendations, as printed by us last week, were all agreed to in substance, after considerable discussion, one amendment to recommendation 5 providing that no scholarships of less than £10 be given.

After transacting other business, the Council adjourned at half-past seven o'clock.

CLERKS OF WORKS' ASSOCIATION :

ANNUAL DINNER.

THE tenth annual dinner of the Clerks of Works' Association of Great Britain was held on Monday evening last in the Venetian Saloon of the Holborn Restaurant, Mr. Thomas Blashill, F.R.I.B.A., Superintending Architect of the London County Council, in the chair, supported by Mr. H. O. Cresswell, President of the Architectural Association, Professor Banister Fletcher, Mr. J. E. Drower, Mr. Howard Colls, and other friends of the Association.

The usual loyal and patriotic toasts having been given by the Chairman (Colour-Sergeant Aitchison replying for "The Army, Navy, and Reserve Forces"),

Mr. F. Dashwood, the Secretary of the Association, proposed "The Architects and Surveyors," and spoke of the great help and countenance which the Association had received at the hands of those gentlemen, and particularly at the hands of the architects. The result of the encouragement which they had received at the hands of professional gentlemen was that the Association was now a thoroughly-recognised and well-established society, doing increasingly good and useful work. Mr. Dashwood, in his characteristically humorous way, went on to allude to the newest "new departure" of the London County Council in proposing to be "its own builder." Well, he hoped that the interests of the clerks of works would not suffer; if they did, he trusted that the Council would behave handsomely to a very deserving body of men, and would instruct Mr. Blashill to prepare plans for a magnificent building in which to house displaced clerks of the works. Perhaps after a time the Council would feel impelled to do something for displaced builders also. After alluding to the responsibilities of the surveyor, Mr. Dashwood concluded by coupling with the toast the names of Mr. H. O. Cresswell, President of the Architectural Association, and Mr. J. E. Drower.

Mr. Cresswell, in replying, said he thanked the company for thus honouring, not only architects, but, he hoped, architecture also. A great deal had been said and written of late on the question whether architecture was to be regarded as a profession or an art, but he thought it was a question which might be left to be decided hereafter. It seemed to him that if architects carried out their work artistically, and if they threw their whole soul and energy into it, with the view of making it as good as possible, others would probably be able to decide whether it was artistic or not; but whether architects called themselves "artists" or anything else seemed to be of very little importance. Let them leave that question to be answered by the next generation, who would be able to judge of them by their works. There was no doubt, however, that the architect must be a practical man; if he were not, he would be laying up a good deal of trouble for himself and a great deal of expense for his clients. Mr. Cresswell went on to say that he had recently heard Professor Aitchison describe architecture as "the art of building properly," and by "building properly" he no doubt included "designing properly." Now when a building had been designed properly it ought to be executed properly, and it was at that point that the clerk of works came in and was of great service. He (the speaker) was not one of those who looked upon a clerk of works as being a sort of watch-dog over a dishonest builder; a good clerk of works was and ought to be something far better than that, and he was very glad to testify that so far as his experience went, the clerk of works was generally a most careful, capable, and reliable man.

Mr. J. E. Drower, in an able and amusing speech, responded on behalf of "The Surveyors."

The Chairman, in proposing the toast of the evening, "The Clerks of Works' Association," congratulated the Association on the satisfactory and successful position which it had attained. The clerk of works was, no doubt, as had been suggested by Mr. Drower, an official of some antiquity. As would be well known to many of them, the poet Chaucer was a clerk of works, but not very much was known about him in that capacity, except that he was a Government *employé* engaged on royal palaces, &c., and that one Saturday afternoon he was stopped and robbed of a bag of money which he was carrying on his way to pay the wages of the workmen,—an incident which one could conceive as more likely to happen to a poet than to a clerk of works in the present day. As allusion had been made to the vexed question whether architecture was an art or a profession, he would venture to say that he had no doubt it was an art, and he thought it was a profession; he did not think it was a trade, but it certainly was a business which of all businesses he knew demanded great knowledge, great tact, and the most absolute integrity. He had naturally had a great deal to do with clerks of works in the course of his professional life, and he had almost invariably found that they were men of ability and resource, and men worthy of the greatest confidenee and respect. After again congratulating the Association upon its progress, and upon the excellent and useful little *Journal* which it publishes, the Chairman concluded by proposing the toast, coupled with the name of Mr. W. R. Cubitt, the President of the Association.

Mr. Cubitt briefly replied, and stated that the Association now numbers 140 members.

Mr. J. Brady, editor of the Association's *Journal*, proposed "The Worshipful Company of Carpenters," coupled with the name of Professor Banister Fletcher, past Master of the Company. Mr. Brady referred to the great and valuable aid which the Company had given to the Association, and to the cause of technical education in the building trades generally. The toast was very heartily received.

Professor Banister Fletcher, in replying, detailed the efforts now being put forth by the Carpenters' Company in the cause of technical education, and referred to the antiquity of the carpenters' craft, and to the important functions which the Carpenters' Company formerly performed in regard to London buildings.

Mr. W. S. Woollacott proposed "The Treasurer, Mr. John Oldrid Scott," whose services to the Association were very warmly spoken of. In the absence of Mr. Scott, Mr. J. Wilkinson replied on his behalf.

Other toasts followed, including "The Visitors," proposed by Mr. E. W. Nightingale, and coupled with the name of Mr. J. Howard Colls, who, in replying, raised a laugh by saying that, though as a practical builder he naturally did not believe in the success of the London County Council's proposal to abolish builders, he believed the builders of London were such a noble body of men that, if they could be persuaded that their effacement would be for the good of the public, they would at once proceed to efface themselves.

Finally, the toast of "The Chairman" was proposed by Mr. T. Spooner, and enthusiastically received.

SANITARY INSPECTORS' ASSOCIATION :

ANNUAL DINNER.

THE tenth annual dinner of this Association was held on Saturday evening last at the Criterion Restaurant, the President of the Association, Dr. B. W. Richardson, being in the chair, and Mr. H. Alexander, Chairman of the Council, in the vice-chair.

The usual loyal and patriotic toasts having been given,

General Webber, who responded for "The Army and Navy," gave an interesting account of the outbreak, in a mysterious manner, of an epidemic of enteric fever in the British camp near Kassasin during the 1882 expedition to Egypt. It was simply the result of ignorance of the first principles of sanitation. The outbreak might have been prevented by merely following out the Levitical prescription for the camp of the Israelities in this very region. Failing to apply the necessary "covering of earth" every morning in the latrines, their contents became desiccated in a few hours in the burning sun, and were carried back daily into the camp, in the form of fine dust particles with which the air was charged. That was an illustration of the importance of a knowledge of the practical details of sanitary work, which, though a common characteristic of the sanitary inspector, could hardly be expected from all professors of the science of medicine.

Mr. John Hutton, Chairman of the London County Council, proposed the toast of the evening, "Success to the Sanitary Inspectors' Association." He congratulated the Association on its prosperous career during its ten years of existence—a period in the course of which there had been a great awakening of public interest in the Association's work, an awakening which afforded the best hope of future prosperity and future progress. The more enlightened public opinion became and the greater the attention the public gave to sanitary matters the more docile and receptiye it would become, and the more ready to make sacrifices for the maintenance of public health. He was disposed to think that the increase in the numbers and importance of that Association was in a great measure due to the eminent services rendered to sanitary science by their Chairman, and his devotion to the interests of the sanitary inspectors as their President. From the growing appreciation of the public, of their work, he augured that the Sanitary Inspector had a brighter future before him. When they saw the School Board compelled to stand aside until the sanitary inspector had performed his important duties, he could not but feel confident that the time was coming when not only the office but the remuneration of the sanitary inspector must grow and increase. With such a record for honesty and devotion as the sanitary inspectors could show, it was impossible not to believe in the brightness of their future prospects. It was a great gratification to him to have been asked to propose "Success to to the Sanitary Inspectors' Association," which he did with the utmost cordiality, and he would couple with the toast the name of his friend, their President, Dr. Benjamin Ward Richardson.

Dr. Richardson, in replying to the toast, referred to the career of the Association as one of continuous success. It had been a great success from the very first. It was a great success when they secured the late Sir Edwin Chadwick as President, that Edwin Chadwick who had been justly called the "Nestor of sanitary science." Last year had been the greatest success of all. They had received the greatest compliment that any Association could receive from a foreign nation, from the sanitarians of France. They had been invited to lay their views before their foreign brethren in a conference at Paris, and they had been shown not only all that was most worthy of the attention of sanitarians in that city, but they had been taken everywhere, and had been fêted and feasted during several days in the most generous manner. Then there was the Berridge Fund, the 3,000*l.* derived from which gave them greater independence and solidity. The sanitary inspectors were "the hodmen" of sanitary science. It was their mission to make England a garden in which no impurity would be allowed to grow, and that they would accomplish by the simple command given by the prophet to Naaman, "Go, wash and be clean." But they must be learned men, and they must work out their own independence by securing more remuneration. That was necessary, not only for their own advantage, but for the good of the public itself. They must work manfully to secure such a measure of independence and such security of tenure in their offices that no power, save that of a Government, could remove them. The President concluded by an assurance of the readiness with which he had acceded to the wish that he should succeed him which had been expressed by Sir E. Chadwick, to whom it was in the greatest measure due that they had so well prospered, and by assuring the members of the Association of the earnestness with which he should always devote himself to their interests.

Other toasts were given, including "The Houses of Parliament," responded to by Mr. Colman, M.P.; "Science and Art," proposed by Mr. Macmillan,

and responded to by Mr. Clodd and Canon Harford; "The Visitors," proposed by Mr. Tidman, and responded to by Mr. H. R. Williams, Chairman of the Hornsey Local Board, and Mr. B. F. Jacob, the Master of the Carpenters' Company; and "The Executive," to which Mr. H. Alexander replied on behalf of the Council.

Books.

Encyclopédie de l'Architecture et de la Construction. Directeur, P. PLANAT. Vol. VI: Premier Fascicule. Paris: Dujardin et Cie.

THE new half-volume of the "Encyclopédie" contains more than the usual number of articles on large and important subjects. M. Garczynski contributes the article on "Nivellement," which goes pretty fully into the subject of levelling, with a number of practical illustrations of instruments and methods. M. Saint-Paul contributes the article on "École de la Normandie," in which the existence of some work of this school in England is (for a wonder) recognised, and it is even admitted that England surpassed the continent, "thanks to the wealth of the prelates brought over by William the Conqueror," though it is not of course thought necessary to give any illustrations of Norman architecture on English soil. The article on "Les Ordres" by the editor is sufficiently full and comprehensive, and admirably illustrated. The article on the "Parthenon" is by M. Loviot, who claims credit for having taken, a few years since, careful measurements of the building, and ascertained that its base was slightly convex, which he regards as a means for ensuring the carrying off of rain-water. Not a single word is said as to Mr. Penrose's elaborate measurements many years previously, nor of the optical reasons for the curvature of the lines. Is M. Loviot really ignorant of the existence of Mr. Penrose's work, or is it that he resolutely refuses to recognise a priority of discovery and a much fuller investigation on the part of an English architect? In either sense the omission is discreditable to him. From the article, it would be supposed that M. Loviot was the first person who had ever accurately measured the Parthenon. One gets almost tired of noticing this patriotic egotism on the part of French architects. The article on the architecture of Holland and Belgium ("Pays Bas"), by M. J. Van Ysendyck, is really valuable for the number of well chosen and carefully executed illustrations. Persian architecture is also ably treated and largely illustrated by M. H. Saladin, and is followed, as an effective contrast, by a very full practical article on "Persiennes et Fermetures" by "P. A. D.," with a number of constructional diagrams and sections. The long article on "Perspective," by M. Julien, is rather too much occupied, in the first portion, by considerations and diagrams of the construction of the eye and the optic nerve, &c., which really does not concern the subject in any practical sense; the whole problem of the draughtsman in regard to perspective is outside the eyeball; he is concerned with *what* the eye sees; *how* it sees is a matter for oculists. When the author gets to the real subject, however, he treats it in a simple and practical manner, aiming at making general principles clear rather than showing highly elaborated problems with a multitude of lines, which has been the general fault of English treatises on perspective. "Pierres de Taille" is a good practical article by M. B. Garcynski; and the signature of "B. G." to the equally practical article on "Planchers et Parquets" is we presume that of the same painstaking contributor. Of the deficiencies of the article "Pont" we have already spoken. "Porche," by MM. Saint-Paul and Nodet, is a well-illustrated but almost exclusively French treatment of the subject, and the same may be said of M. Rivoalen's article on "Porte." "Porte de Ville," signed "R.," and probably by the same contributor, is a little wider in its survey, and is at any rate illustrated with a great many charming and picturesque examples.

The general article on "Postes et Télégraphes" is by M. Guadet, architect of the new building of this class at Paris, who remarks that a post office building is only a kind of instrument of service which changes, or should change, with every change and improvement in the method of postal service; and he adds that he is well aware that the building which he has just completed in Paris must, in a certain time, longer or shorter, become antiquated, when the post is carried on in quite a different method from now,—"peutêtre sans chevaux ni voitures." He gives plans of the London, Berlin, and Bremen post-offices, rather by way of history of the subject, as the two former, at all events, must be considered out of date as models; that of Bremen is a recent building. M. Rivoalen ("E. R.") adds some account, with plans, of M. Guadet's own building. The same contributor treats "Prison," in a rather too succinct and hardly adequate manner. "Profiles, Moulures" is a large subject most inadequately treated by the editor, who again knows nothing of any Gothic mouldings except French, and to anyone acquainted with our grand and varied English mouldings (in which detail at all events English Gothic can fear no comparison with any other country), the poor and weak sections of Gothic mouldings given in this article must appear a most pitiful illustration of this type of architectural detail; nor is the writer much more at home in the treatment of Greek mouldings, of the peculiar refinements of which no one would get the slightest idea from his description and examples.

Six Months in the Appennines; or, a Pilgrimage in search of vestiges of the Irish Saints in Italy. By MARGARET STOKES. London: G. Bell & Sons. 1892.

THE object of the tour which this book recounts was partly to find in Italy examples of the style of ornament which was prevalent in Ireland in the early Mediæval period, by way of tracing the artistic and historic connexion of these Irish forms of ornament with what the writer is disposed to regard as the land of their origin; in fact, "to find a clue to the origin of Irish art." A good deal of the book is occupied with matters of ecclesiastical history which do not much concern us, but in regard to the question of art history the author calls attention to some interesting examples in Italy of details of ornament with which early Irish art certainly seems to have some connexion. The ornament on the ciborium of S. Giorgio de Valpolicella, dated 712, from the Vatican museum, is a curious example in this respect, in which one half-arch has a reminiscence of the Roman guilloche, and the other half an interlaced pattern of what we are accustomed to call the Celtic type. A more marked and more distinctly Celtic-looking example is that from the cloister of San Lorenzo fuor le Mura, at Rome. These and other examples certainly support the author's view that the idea of the Irish or British origin of this type of ornament must be abandoned by those who have hitherto held it, and that Italy was the half-way house in this respect between Byzantine and Ireland.

The remainder of the book is somewhat desultory in arrangement, and is occupied with the search, about the neighbourhood of Lucca, Bobio, and other places in North Italy, for traces of the history of saints who have become more especially associated with the Irish church,—St. Frediano and St. Columban, and others: but this is accompanied by sketches of and remarks on various old churches and decorations which are more or less interesting, especially the illustrations of the bas-reliefs on the sarcophagus of St. Columban at the church dedicated to him at Bobio. The book is agreeable throughout; but a considerable portion of its contents do not come properly within our scope.

J. Overbeck Geschichte der Griechischen Plastik, Vierte umgearbeitete und Vermehrte Auflage. Erster-Halbband mit 76 Abbildungen. Leipzig: J. C. Henrichs. 1892.

IT is impossible to pass over the appearance of the fourth edition of Overbeck's Greek Sculpture without a word. Now that in England we have our own standard histories of Greek Art as well as translated handbooks innumerable, we do not so inevitably refer our students to Overbeck, but we can never forget that but for his work our own English school of archæology would scarcely have existed. There is not an English archæologist over thirty who did not get his preliminary training from the great German compiler. Compiler in the best sense, Overbeck always was; a collector of facts, apt in the sifting of evidence, and the weighing rather than originating of opinion. The section on Mycenæ antiquities is, of course, practically new, and it is a good example of Overbeck's manner; his tone in dealing with this still burning question is a model of moderation. He fully realises how much yet remains problematic. Scarcely anyone will quarrel with his general conclusion that there are elements in the Mycenæ civilisation that originated independently of but were much influenced by contact with Egypt and the East. Details cannot be entered into here; it is enough to say that the book is on the whole brought up to date, and we suppose the publisher is to blame for re-admitting such inaccurate reproductions as that of the Corinthian puteal on p. 251.

Correspondence.

To the Editor of THE BUILDER.

PROPOSED BYE-LAWS UNDER THE PUBLIC HEALTH (LONDON) ACT, 1891.

SIR,—The draft bye-laws are being circulated among the Sanitary Authorities, doubtless in order to afford opportunity for criticism. I have not, however, met with any objection or expression of approval by builders, architects, or surveyors, though they will all feel keenly the effect of the bye-laws. Perhaps you will allow me to elicit remarks by calling attention to one or two of the proposed provisions. When the bye-laws have received the sanction of the Local Government Board, the local Sanitary Authorities will be obliged to see that they are enforced, and will have apparently no power of dispensation. The County Council may do any work neglected by the Sanitary Authority, in the way of securing the punishment of offenders, if it chooses.

1. *As to Water-closets.*—Under these bye-laws a new w.c. cannot be constructed in the central portions of a building, unless it has an external wall on one side, abutting on an open space of not less than 100 sq. ft. of superficial area. Water-closets, lighted and ventilated by roof lights only, of whatever form, will not be allowed. In expensive sites the closets will thus be confined to upper stories. Even on a top story the w.c. must be thrust against the boundary wall of the site—unless the difficulty as to carrying down the soil-pipe on the inside of the building is got over.

In a valuable site, 100 ft. from back to front, and with a frontage to the street of sixteen ft., it would often be a subject of regret if the soil-pipe had to be brought down on the narrow street frontage. Shops in crowded thoroughfares will be awkwardly placed, when they have no back fronts and no internal areas; the water-closets must be against the street, but there must be no basement where the soil-pipe descends. There can be no manhole between the foot of soil-pipe and the sewer—for a soil-pipe passing through a basement (even a vault under a street pavement) will be illegal.

A recognised form of warehouse building on small sites, with the lower floors lighted by open wells with skylights over them, each floor covering the whole area, cannot be erected under the proposed bye-laws, unless water-closets are omitted. The 100 superficial feet required for dwelling-houses under the 1855 Act will thus come in by a side wind for warehouses also It will be an exercise in planning to place a goodly number of water-closets adjoining a small area, and to give each an external wall in which a "window, not less than 2 ft. by 1 ft., exclusive of the frame, may be placed."

2. *As to Soil-pipes.*—The proposed bye-law as to these states that they must be erected outside the building. Some of the inconveniences of this iron rule have been already hinted at. Perhaps the simplest way of dealing with a soil-pipe from upper stories in the central portions of buildings will be to put little open areas—large flues in fact—to contain the pipes. It would be necessary to make them large enough to be accessible, say 2 ft. square. The most liberal District Surveyor knows nothing thinner than a 9-in. wall, so that a space of 3 ft. 6 in. by 2 ft. 9 in. will be gouged out for the passage of the pipe, which, up to the present time, would be placed in a chase and reached by the removal of a wooden casing.

While recognising that soil-pipes *should* be placed outside the walls when it is convenient to do so, I think it may be well to point out, what has so often been pointed out before, that some people have not the warm affection for external soil-pipes in all imaginable positions, which stirs the minds of some writers about them. They are affected by frost on the cold sides of buildings, and by the heat of the sun on the other side, and they frequently exhibit themselves very awkwardly. The design of an important building ought not to *hinge* on the position of a soil-pipe. When a thousand things, all of them all-important, require attention, one of them should not elbow the others out of its way.

A soil-pipe, ventilated at the top and reaching a drain near a ventilated manhole at the bottom,

cannot be a fearful source of danger. It has, in good work, no connexion with any foul drain or sewer, it is not unduly large, is made of thick lead, and well scoured by flushes.

These remarks have been thrown out in order to show that there is debatable matter in the bye-laws; there are in them a number of other provisions which deserve a thorough scrutiny. No one would object to the abolition of the dark w.c. tucked into a small vault of too limited height under a street pavement; nor of dark water-closets with four story air-shafts; nor of water-closets opening into central staircases lighted only down the well holes, and other similar insanitary makeshifts. Some of these people, however, who know the difficulties of making the best use of expensive sites, devoted to modern complicated buildings, may think that legal obstruction might stop short of the proposals in the bye-laws.

F.R.I.B.A.

THE ORIENTATION OF CHURCHES.

SIR,—Adverting to the remarks of Mr. Loftus Brock (Feb. 11) it was desired in my previous letter, to which he alludes, to emphasise the facts that a shadow from an upright pole at sunrise may give several diverging lines in the same latitude *on the same day*, whereas the rule deduced from calculation would give but one line for each day, varying only with the latitude, with unerring precision; and thus avoid a complication of lines from which apparently no further information, than that a reference to *one* day was intended, could be gained, as would be the case with a single line.

Moreover, the rule supplying an angle by calculation could be applied at any time—in the same way that we by referring to azimuth tables can ascertain the angle of sunrise in any latitude, for any season of the year, and with a knowledge of the true north can, therefore, at once lay down any required line—and consequently be free from that serious objection, to which the other rule is open, of waiting for a particular day, with the grave doubt whether the sun would be seen or not at the required time when that day arrived.

Mr. Brock adds truly "that the axis of a square body, if set out to sunrise at the summer or the winter solstices, will, for many positions in our island, have its angles directed to the cardinal points." But it may be noticed that those positions must be to the north of the Tweed, for it is not until the 56th deg. of north latitude is approached that the true bearing of the sun at rising is 45 deg. north of east at the summer solstice, and the same number of degrees south of east at the winter solstice,—as can be seen by reference to the tables before mentioned or to Mr. Francis Jones's table—obviously a necessary condition in any of such cases.

J. HOUGHTON SPENCER.

Taunton, February 14, 1893.

P.S.—In referring in my last letter to certain days as being the same in *name only* from century to century, consequent upon the increasing error in the Julian Calendar if such error were left uncorrected, the expression "nominally so" was used. This in the type has been rendered "nominally twenty," but the idea of specific number was not intended to be conveyed.*

SIR,—Mr. J. H. Spencer in his letter on the above subject in your issue of the 11th inst. says, "it is believed that Wordsworth is responsible" for "the poetical idea of ancient church founders waiting for the rising sun in order to get a guiding line for their work." What Mr. Spencer alludes to appears to be a note appended by Wordsworth to his (second) poem, "To the Lady ——, on seeing the foundation prepared for the erection of —— Chapel, Westmoreland," and which is as follows:—

"Our churches, invariably perhaps, stand east and west, but *why* is by few perhaps *exactly* known; nor that the degree of deviation from due east, often noticeable in the ancient ones, was determined, in each particular case, by the point in the horizon at which the sun rose upon the day of the saint to whom the church was dedicated." The question is—where did Wordsworth get his information from? or what authority had he for his assertion? And is it really anything more than a mere "poetical idea"?

The extract which Mr. White has given from Durandus seems to show unmistakably that in his time (the middle of that great church-building epoch, the thirteenth century) no such rule as that referred to was known. His object in what he says seems to be merely to remind church-builders that if they wish their churches to stand due east and west (which he appears to assume they, as a matter of course, will do), they must be guided by the point at which the sun rises at the equinoxes.

H. E. T.

* The "so" in the MS. was misread for "20" in numerals.—ED.

PASSAGE OF AIR.

SIR,—Can any of your readers give the formula for the reading of an anemometer in calculating the lineal feet of air passing in at, say, a 3 in. circular pipe, and also at a square shaft 9 in. by 9 in.?

CONSTANT READER.

The Student's Column.

CHEMISTRY.—VII.

FOG.

WHEN the air in the vicinity of any large surface of water becomes warmed, it is capable of absorbing a considerable quantity of the water in the form of water vapour; but when this air again becomes cooled, the water it absorbed when warm, condenses out in very minute drops, which float in the air and form a visible *mist*. If, however, the surfaces upon the earth become cool more quickly than the air, the water vapour in the air condenses upon these surfaces, and forms *dew*, instead of forming a mist.

It follows from what has been said that all places in the neighbourhood of large surfaces of water, such as rivers, marshes, and seas, must be always more or less subject to mists, and that these will be most frequently formed where the changes in the temperature of the air are greatest and most frequent.

Now if this mist is formed within a large town, it will carry down with it all the floating solid matter in the atmosphere through which it passes, and a considerable quantity of the gaseous impurities. In a town like London, the air always contains large quantities of "smoke," of carbonic acid, and of a gas called sulphurous oxide, which, although an antiseptic, greatly irritates the lungs; and in addition, traces of sulphuretted hydrogen and other sulphur compounds. All these are products of the combustion of coal, and by far the largest quantities are sent into the air by private householders, not by manufacturers. When a mist is formed in London and carries down with it these products of the combustion of coal, it constitutes a "pea soup fog," or, as Dickens calls it, "a London particular." But this is not the worst feature of a London fog. There are always present in the air of a town a large number of organic germs, produced by decaying, and sometimes diseased, organic matter. These also are carried down in the fog, and are taken into the system in the act of inspiration.

Further, when either a dense mist or fog forms, it is impossible for the air respired from human beings and other animals to rise to any great distance through it, and, moreover, the fog clouds are constantly rising and falling and moving about in great waves. It is no uncommon occurence for the air in a London street to change from clear to foggy five or six times in one morning. The consequence of this is that, in London, the four or five million people are constantly inhaling, for a time, portions of one anothers' respiration products, which, as we have seen, always contain a quantity of highly decomposable organic matter. In winter time, when fogs and mists are most frequent, and infectious ailments most rapidly spread, the extent to which they spread will, therefore, depend largely upon the frequency and duration of the fogs, but also, of course, upon the density of the population, the previous state of the health of that population, and upon the sanitary condition of the town.

Disinfectants and Antiseptics.

Many kinds of disease are capable of being transmitted from one person to another by means of the minute living organisms expired in the breath. As Baldwin Latham very truly remarks: "It is difficult to conceive how small an amount of matter the germ may be in zymotic diseases, and how rapidly it may develop." The disease-producing germs are, in fact, quite invisible, except under a very powerful microscope, but they are capable of starting an epidemic of fatal disease, and may remain harboured for years in clothing or bedding without losing their power of carrying some particular form of illness to a fresh victim. It appears, however, that for the development of some forms of disease by germs it is necessary for the person operated upon to be previously in a weak state of health.

The words disinfectant and antiseptic are unfortunately often used as synonymous terms. This should not be so. A disinfectant, as understood by the sanitarian, is a substance capable of destroying disease-producing germs, while an antiseptic is a substance that merely prevents the development of these germs. Thus, while mercuric chloride is a disinfectant, camphor and eucalyptus oil can only be regarded as antiseptics.

One of the methods of comparing the destructive power of the various disinfectants is to cultivate some germs in a tube containing a soft mass of gelatin. In this substance they rapidly increase, forming "colonies," and when a certain number of colonies have been obtained, the disinfectant is brought into contact with them, and the time taken to completely destroy them is noted.

At the present time there appears to be much doubt as to which of the so-called disinfectants are true disinfectants, and which merely antiseptics. Thus, carbolic acid, which has hitherto been generally regarded as an excellent disinfectant, is now classed by some with the antiseptics, although apparently there is little reason for doing so. From the distinction drawn between the two terms, it will be noted that whereas all disinfectants are antiseptics, antiseptics are not necessarily disinfectants.

In some cases, such as when sulphurous oxide is employed, the question whether the material will act as a disinfectant or an antiseptic probably depends upon the thoroughness with which it is applied.

For efficient disinfection, a solution of *mercuric chloride* ($HgCl_2$) commonly known as corrosive sublimate, is recommended. It is much used in hospitals. The great objection to its use is its very poisonous character. As it forms a colourless solution, it is generally coloured with indigo or other colouring matter to prevent its being mistaken for water.

Of late years, *superheated steam* has been much recommended for the disinfection of all substances such as bedding and clothing. The materials are placed in a cylindrical oven heated by a steam jacket, and then through the oven itself superheated steam is passed. By this method, the materials are heated through and through to a temperature of above 212 deg. Fahr. without scorching them, and at the same time without wetting them. It is said to be a most efficacious method for completely destroying germs, and also parasites of all kinds.

For disinfecting liquids by oxidation, *permanganate of potassium* still ranks very highly. When brought into intimate contact with sewage, its deodorising and disinfecting properties are beyond all doubt.

In London, *sulphur dioxide* (SO_2), or sulphurous oxide as it is called, is most commonly used for disinfecting the atmosphere, walls, and furniture of a room, notwithstanding the fact of some doubt having been expressed as to its action as a true disinfectant. This compound is formed when sulphur is burnt in the air, a little methylated spirit being usually added to make it burn more readily. When disinfecting a room by this method, all openings by which the gas might escape must be closed, and the sulphur dioxide should, moreover, be allowed at least twelve hours to complete its action. All doors, windows, and flues should then be opened, and when the atmosphere of the room is once more in its normal condition, the room should be thoroughly cleaned. Sanitary inspectors usually employ carbon bisulphide (CS_2) as a more convenient method of generating sulphurous oxide. Carbon bisulphide is a highly inflammable, colourless liquid, and if it is desired to rapidly generate a large quantity of sulphur dioxide, one or two ounces of the liquid are ignited in a saucer. As the liquid will not mix with water, when once ignited water is useless for extinguishing the flame. A safer method of burning bisulphide of carbon is to burn it like an oil in a lamp. This latter method is much used in hospitals.

The reaction which occurs when bisulphide of carbon is burnt may be expressed thus:—

$$CS_2 + 3O_2 = 2SO_2 + CO_2.$$

When subjected to a pressure of about three atmospheres, sulphur dioxide gas condenses to a liquid, although, immediately the pressure is diminished, the liquid returns to the gaseous condition. Liquefied sulphur dioxide is sold commercially in iron or glass syphons, and should prove very useful to sanitarians. Immediately the cock of the syphon is opened, the sulphurous oxide rushes out in the form of gas and of a fine spray.

Chlorine gas is sometimes employed for disinfecting, and is then generally obtained by pouring commercial hydrochloric acid, *i.e.*, "spirits of

salts," upon some bleaching powder exposed in a saucer. As chlorine gas attacks iron bedsteads and other furniture, it can only be used in certain cases.

Eucalyptus oil, the favourite antiseptic during the recent epidemics of influenza, possessing genuine antiseptic properties, and being volatile and non-poisonous in small quantities, is very valuable for preventing the spread of infectious diseases; but there are said to be so many species of the eucalyptus tree that do not yield the true antiseptic oil, and the sudden and great demand for it has led to such extensive adulteration, that purchasers should take every precaution to obtain the genuine antiseptic oil. The use of a sophisticated article, especially during epidemics, may lead to very serious consequences.

The eucalyptus tree is much grown in the South of Europe, especially in malaria districts, like those near Rome, because the tree grows so rapidly that it absorbs an appreciable amount of moisture from the ground; and the exhalations from the leaves, moreover, purify the surrounding air to a certain extent. Eucalyptus oil is used in the preparation of certain medicinal compounds, both for internal and external use; it is also utilised in perfumes and for scenting soap.

Common *camphor* is a valuable antiseptic obtained from the *Laurus camphora*, and is closely connected with the series of hydro-carbons termed the terpenes.

Many good antiseptics and disinfectants are completely spoiled by being mixed with some substance which neutralises them. Thus in some of the so-called *carbolic acid powders*, the basis of the material being lime, a mixture of carbolate and cresylate is formed with the carbolic acid, which is worthless for disinfecting.

Sanitas and several other well-advertised preparations have undoubtedly genuine disinfecting or antiseptic properties, as the case may be; but sanitary inspectors and others whose duty it is to constantly use and recommend disinfectants and antiseptics should know their composition, and thoroughly understand their value before doing so.

A great number of other disinfectants are known, but those mentioned above are among the most important.

Experiments, Group 4.

Qualitative Examination of Air, Fog, &c.

1. *Aqueous Vapour.*—Nearly fill a clean, dry tumbler with pieces of ice, and observe the fine mist which condenses on the cold *outer* surface of the glass, and that after a time drops of water of considerable size trickle down the outside of the tumbler.

The amount of aqueous vapour may be estimated quantitatively by drawing a known volume of the air through a U tube containing fragments of pumice-stone moistened with concentrated sulphuric acid, and ascertaining the increase in the weight of the tube. (Fig. 7.)

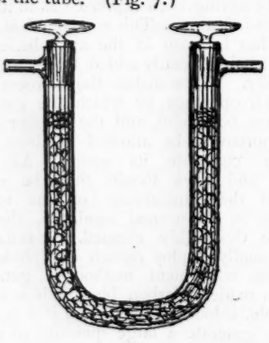


FIG. 7

2. *Organic Impurities.*—Nearly fill a cylindrical tube (Fig. 8) with very dilute acid potassium permanganate solution (see examination of water),

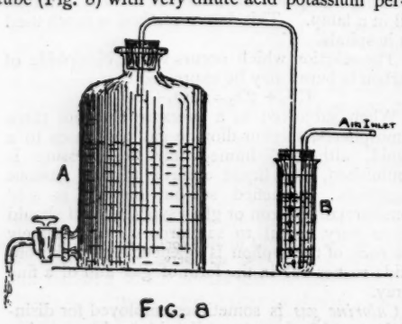


FIG. 8

and draw through it a large volume of the air in the manner shown in the figure. The aspirator A may be filled and emptied several times in order to draw a large quantity of air through the tube B.

As in the case of water, the delicate pink colour will fade more or less rapidly, according to the amount of organic matter present.

3. *Carbonic Acid.*—Nearly fill the small cylindrical tube shown in Fig. 8 with clear lime water or barium hydrate solution, and draw air through it as before. A white precipitate will gradually be formed if carbonic acid is present in the air.

4. *Ammonia.*—Draw a large volume of the air through some distilled water contained in a cylindrical tube in the manner described above, and ascertain whether any ammonia has been absorbed by the water, by means of Nessler solution (see "Examination of Water").

5. *Sulphuretted hydrogen.*—Moisten some white blotting-paper with some solution of acetate of lead and expose it to the atmosphere to be tested for an hour or two. If traces of sulphuretted hydrogen are present in the air, the paper will become brown. All air should be quite free from this impurity.

6. *Sulphurous acid*, like ozone, causes white blotting-paper moistened with a solution of potassium iodide and starch to become blue. Moisten some white blotting-paper with these solutions and expose it to the air. When applying the above tests, it must be remembered that the percentage amounts of impurities, even in very unhealthy air, are comparatively very small.

Preservation of Food.

The putrefaction of food is caused by the deposition in or upon it of certain organic germs which are always floating about in the atmosphere, and by the development of these germs. The germs, however, cannot develop or act unless moisture is present and the temperature is moderate.

Hence food may be preserved (1) by sealing it out of contact with air; (2) by removing all moisture from it; or (3) by keeping it at a temperature at which the germs are incapable of acting.

1. The first method is employed in the case of tinned provisions. To preserve meat, the meat is placed in a tin and the lid then soldered down, leaving, however, a pin-hole in it to allow steam and air to escape. The tin containing the meat is then heated in a solution which has a higher boiling-point than water, to about 230° F. This treatment sterilises any germs and causes a considerable proportion of the air in the tin to be expelled through expansion. While still hot the pin-hole in the cover is closed with solder, and the tin is thus rendered air-tight.

2. The preservation of food by drying it is a very old method. It is seen in the case of dried fruits and dried South American beef. It was a method much employed by the ancient Egyptians.

3. The third method is that most employed at the present time. Refrigerated meat and other food travels about in enormous quantities in all parts of the world, while many hundreds of tons of ice are daily employed in England alone for the preservation of fish.

GENERAL BUILDING NEWS.

CATHOLIC CHURCH, KIDSGROVE, STAFFORDSHIRE.—The Catholic Church of St. John the Evangelist, Kidsgrove, has just been carried out to the designs and under the personal superintendence of the architects, Messrs. Wm. Sugden & Sons, of Leek. The west gable of the church is its salient feature, and it contains a seven light window, almost entirely traceried, the two central mullions resting upon carved corbels. The gable is flanked by double angle pinnacles, and terminates in a canopied niche cot enshrining a crowned effigy of the Virgin Mary. The east gable is occupied by the sanctuary rose window, with a full central panel for the figure of the patron saint. The entrance to the church is by a stone roofed porch on the south side. The church itself is divided into six bays with three-light windows, trefoil headed, on each side, placed at a considerable height from the floor. The church has a spacious sanctuary flanked on the south by the choir, leading into the sacristy. The confessional occupies the angle between the church and the choir. The sanctuary roof is carried by carved winged angels. Internally the walls are faced with bastard bricks, above a dull polished wainscotting of Lequoia wood. The font enclosure and the seats are of the same wood and oak similarly treated. The floors are of oak blocks to the sanctuary, and red wood elsewhere. The nave is lighted by sun-lights. Externally the walls are faced with Woodville sand stocks with dressings of Sheen and Grinshill stones, and the roofs are covered by Broseley tiles. The altar and reredos are in Bath stone and Staffordshire alabaster, the tabernacle safe door being enriched by *repoussé* brass facings representing the vine and corn conventionalised. The reredos central canopied panel is occupied by the monstrance, and two sculptured compartments on either side, one filled by angels kneeling with outspread wings, with tracery above and beneath. Six pedestals divide these compartments prepared to receive statues of the saints. The font, which is octagonal in form, is moulded and carved, and has a cover of traceried oak.

STONE.—The freehold building land known as the Hill House Estate in the parish of Stone (Kent) and consisting of about 20 acres is about to be laid out and some 200 cottages built thereon as a model village for the *employés* of the cement factories and other industries in the immediate neighbourhood, the majority of whom have to walk some three or four miles to their homes. The scheme includes also some eight shops and larger residences, and the owners, Messrs. Mathews & Wyatt, propose to give for the free use of the tenants on the estate a village hall and institute with recreation grounds for the children. The architects and surveyors for the works are Messrs. Fryer & Fitzgerald of London and Bournemouth.

WESLEYAN CHAPEL, PENRYN.—On Tuesday last, Dr. J. H. Rigg, President of the Wesleyan Conference, opened the new Wesleyan chapel at Penryn, which has been erected at a cost of £4,000, from designs by Mr. J. W. Trounson, F.R.I.B.A., of Penzance. The new building is Norman in style, and the principal feature of the front is the colonnade, entered through two large openings, and the three-light window over. The window is filled with stained glass by Fouracre & Co., of Stonehouse. The front of the chapel is built of polished Aberdeen and gray granite facings, cut and polished by Freeman & Co., of Penryn. The interior of the chapel provides seating accommodation for 450 worshippers. Its dimensions are 63 ft. by 48, and the distance from the ceiling to the floor is over 36 ft. At the extreme end of the chapel there has been erected an oak rostrum, Early English in style. The floor is made to slope from the front to back about 18 inches. The seating is of pitch pine with oak mouldings. From the colonnade the gallery is reached without interfering with the body of the chapel. The gallery, which occupies three sides of the chapel, is built to accommodate 400. By day the chapel is lighted by ten large circle-headed windows, in addition to the three-light window in the gable end. The ceiling was manufactured by Messrs. Jackson & Sons, of London, and fixed by Mr. A. Carkeek, the contractor, of Redruth. On the gallery, floor level, behind the rostrum, is the organ chamber, designed by the architect in conjunction with Messrs. Hele & Co., of Plymouth. On each side of the chamber there are choir practice and book rooms and a large class-room for the adult members of the chapel. Behind the chapel on the same level, and immediately underneath the organ chamber, is a ladies' parlour, measuring 26 ft. by 18 ft. On the same floor are the ministers' vestry and ladies' cloak-rooms. Behind the chapel building itself school premises have been erected. They contain on the ground floor an institute room and four large class-rooms. At the rear there are lavatories and other conveniences. Wide stairs lead to the schoolroom, the length of which is 63 ft. by 24 ft. Adjoining the schoolroom is a tearoom. The area of the whole building site is about 12,000 ft.

PROPOSED MUNICIPAL BUILDINGS, BRISTOL.—At the quarterly meeting of the Bristol Town Council, held at the Council House on Tuesday, the following report from the Committee on Sites for Municipal Buildings was submitted:—"The Council will remember that your committee were appointed, on October 11 last, to consider and report as to the relative area, cost, and advantages of any site they might deem suitable for the requirements of municipal buildings. Your committee report that in addition to the accommodation stated in the report of the Finance Committee of August 5 last—approved by the Council on October 11 last—to be required in municipal offices, and which your committee consider is absolutely necessary, they are of opinion it is desirable that:—(1) A picture and fine arts gallery; (2) a hall capable of seating 1,000 persons; (3) a banqueting hall capable of dining 100 persons, with reception-rooms, kitchens, &c.; and (4) a central library, reference library, and reading-room be provided in the new municipal buildings. Your committee have obtained information as to the area of, the accommodation provided in, and the cost of the municipal buildings in several of the larger boroughs in which such buildings have been recently erected. Your committee have had their attention called to a number of sites, but are of opinion that it is desirable that, before further considering or having ground plans prepared of these or any sites, they should visit some other towns, with a view to ascertaining what accommodation is provided in these municipal buildings; and they are also of opinion that they should be able to engage such professional assistance as they may think expedient, to advise them upon and to otherwise assist them in the consideration of the subjects on which they are required to report. Your committee therefore recommend that they be authorised to visit other towns and engage such professional assistance

accordingly." After a good deal of discussion had taken place relative to the proposal of the Committee that they should be empowered to visit other towns where municipal buildings had been carried out, the report was received and the last paragraph adopted.

POTTERY BUILDINGS, WOODVILLE, BURTON-ON-TRENT.—A large new slip house is about to be erected at Woodville, near Burton-on-Trent, for Messrs, Outram & Co., earthenware manufacturers, from the plans and under the supervision of Mr, R. E. Carpenter, architect, Burton-on-Trent. The contract for the builders' work has been let to Mr. J. Varlow, of Burton, and those for the engineers' works to Messrs. Buxton & Thornley, of Burton, and Mr. W. Boulton, of Burslem.

HARRIS FREE LIBRARY, PRESTON.—This is now almost completed, and we understand it is intended to open the building this summer. The pavements of the building have just been completed by Messrs. J. and H. Patteson, of Manchester, on a consistent design by the architect, Mr. James Hibbert, of Preston. The grand staircase and central hall on the ground floor are laid with a combination of rouge griotte, dove, black, vert antique, and white-veined marbles, with Hopton wood stone. The pavements of the principal and upper floors are in Roman mosaic, the borders chiefly in black and white marbles, and the centre a mixture of rouge Verona and Carrara marbles.

FOREIGN AND COLONIAL.

FRANCE.—Besides the Meissonier exhibition at the Georges Petit Gallery next month, the École des Beaux-Arts is organising another in which works not exhibited or engraved will be seen, especially some bronzes cast after Meissonier's models, his bust in marble commissioned from M. Saint-Marceau for the Institute, the medallion in bronze by M. Chaplain for his tomb at Poissy, and the model for the commemorative monument for the Louvre gardens, by M. Antonin Mercié.——M. Jules Guiffrey, keeper of the national archives, has been appointed manager of the Gobelins manufactory in place of the late M. Gerspach. He is a learned and well-known writer on art; among his works may be specially mentioned his biography of Van Dyck and "Histoire de la Tapisserie."——M. Mayeux, government architect, and designer of the Venetian masts in bronze which adorn the Place de la République, has just been appointed professor of decorative composition at the École des Beaux-Arts, in place of the late M. Galland.——By a decree of the President of the Republic, Mr. George Donaldson, member of the Royal Institution of Great Britain, has been created Chevalier of the Legion of Honour for services rendered to art in France. Mr. Donaldson was vice-president of the jury of awards at the 1889 exhibition.——The forty-three designs sent in competition for the Hôtel Boucicaut are on exhibition at the Hôtel de Ville of Paris.——The "Union liberale des artistes Français" is to open its second exhibition in May, in the central dome of the Champ de Mars.——At the École des Beaux-Arts the Labarre competition (subject, a "Palais de Justice") has just been decided in favour of M. Olivier, pupil of MM. Daumet, Girault, and Esquié.——The Department of Public Instruction has just commissioned from M. Falguière a statue of the Republic to be placed in the French section at the Chicago Exhibition. The sculptor has engaged to deliver the statue, finished in plaster, in two months.——At the town of St. Flour (Cantal) a competition has been opened for a monumental hotel intended as a Mairie and a savings bank for the town.——The Rouen Museum has acquired the portrait of Delacroix by Géricault; the only portrait, it appears, which the celebrated author of the "Raft of the Medusa" is ever known to have painted.——The Town Council of Mézières has decided that the statue of Bayard, the model of which has been just finished by the sculptor, M. Croisy, shall be erected in the middle of a new square in course of construction in the town.——M. Jean Paul Laurens, the painter, has been appointed director of the École Nationale des Beaux Arts at Toulouse, in place of M. Garipuy, recently deceased. M. Labade has been appointed Conservator of the Museum in the same town.——The Société Académique de l'Architecture of Lyons has awarded a gold medal to M. Armbruster, a silver-gilt medal to M. Montaland, and a bronze medal to M. Debry. M. Armbruster was the author of a very original design for a sundial, illustrated in the *Builder* of April 5, 1890.——M. de Marçay has been appointed Commissary-General of the International Exhibition at Lyons, which is to take place in 1894.——The death is announced, at the age of 46, of M. Bouillot, member of the Société Centrale des Architectes, and the author of some important works on Paris, as well as of the reconstruction, in the style of Louis XIII., of the remarkable château of Montry, in which the preliminaries of the treaty of peace of 1871 were exchanged.——We learn, at the last moment, that the Senate has determined, by a large majority, to institute a competition for the rebuilding of the Opera Comique at Paris. This is very satisfactory, considering the universal wish expressed by the architectural societies, both of Paris and the provinces.

MISCELLANEOUS.

THE HOUSE OF COMMONS.—The question of the enlargement of the House of Commons, in regard to sitting accommodation for its Members, has again come to the front. In the words of the *Spectator*, "the intensity of the party struggles, and the growing keenness of Members, is rendering the want of accommodation in the House more than ever a burning question." Our contemporary advocates the enlargement of the present House by making it broader by three rows of benches on each side, and longer by, say, 20 ft. It does not venture to give details as to the way in which this enlargement could be effected. On the other hand, the *Speaker* deprecates any proposal to enlarge the size of the Commons' chamber, contending that the chamber is quite large enough for the average attendance of working Members, and that any attempt to enlarge it would spoil it acoustically. It seems to be only on "show" occasions that any inconvenience is felt. Mr. Labouchere, of course, has a scheme of his own, referred to by Mr. William H. White, in an article in the current number of the *R.I.B.A. Journal*.

FREE LECTURES AT CARPENTERS' HALL.—Many of our readers will be glad to have their attention drawn to the programme of free lectures at Carpenters' Hall, commencing on Wednesday evening next, as stated in our advertising pages and calendar of meetings.

THE ENGLISH IRON TRADE.—But little change is to be recorded in the English iron trade, and the majority of the leading districts report a limited demand in both crude and finished material. Prices generally are barely upheld, and in a few instances lower rates have been accepted. The tinplate branch, however, shows a further improvement in demand. The allied industries, such as engineering and shipbuilding, are still in a dull condition. The coal trade remains dull.—*Iron*.

RAILWAY RATES AND THE BUILDING TRADES.—Last week the Nottingham Master Builders Association unanimously passed the following resolution, coupled with the request that the Secretary would send copies to the railway companies serving the town:—

"That this annual meeting of the Masters Builders' Association of Nottingham, held Thursday, February 9, 1893, protests most strongly against the unwarrantable increase of railway rates to the building trades, and respectfully requests the various companies serving the town and district to bring the rates back to such levels as will be conducive to the preservation of the trades referred to."

"AN ARCHÆOLOGIST'S UNEXPECTED WEALTH."—Referring to the paragraph under this heading in our issue for February 4, Miss Mary A. Way, daughter of the late Mr. Albert Way, says, in a letter to the *Spectator*, that the story of her father having had a fortune left to him under the singular circumstances mentioned by Mr. Ingress Bell is without foundation. In an editorial note appended to the letter it is suggested that the story is applicable to the Rev. Lewis Way, the father of Mr. Albert Way.

FALL OF A CHURCH TOWER NEAR KENDAL.—According to the *Leeds Mercury* the work of building a new church at Setside, near Kendal, has come to a sudden termination. The building of the masonry was progressing satisfactorily, when, on the 8th inst., half of the tower fell to the ground, through the big arch pressing out the buttress at the north side. One side and end of the tower have gone to the foundation, and some of the standing portion is shattered. The falling tower has carried with it a portion of the roof of the church. The tower had reached a height of over 40 ft.

ARCHITECTURAL ASSOCIATION: DISCUSSION SECTION.—The seventh meeting of the session was held at the rooms of the Association on Wednesday evening, the 15th inst., the chairman, Mr. S. B. Beale, presiding. A racy and suggestive paper on the subject of "Domestic Stoves and Ranges" was read by Mr. Edward Greenop. The opinions advanced provoked a lively discussion, which was vigorously opened by Mr. C, H. Brodie, and was sustained by a large number of the members present. The subject of draughts in rooms in connexion with the question of independent air supply to stoves received particular attention, and many useful hints were contributed. It was announced that the subject of Mr. A. H. Clark's paper at the next meeting is to be "Hints on Town Houses," instead of that announced in the syllabus, and the hope was expressed that the interest of the subject would attract a large attendance.

SANITARY ASSURANCE ASSOCIATION.—The twelfth annual meeting of the members of the Sanitary Assurance Association was held on Monday, the 13th inst., at the offices, No. 5, Argyll-street, W., Surgeon-General Cornish, C.I.E., F.R.C.S., President, in the chair. Mr. Joseph Hadley, Secretary, read the annual report, which referred to the work of the Council in promoting the Sanitary Registration of Buildings Bill, and stated that Mr. R. Biddulph Martin, M.P., had undertaken the charge of the measure in the new Parliament. The report was adopted.

CAPITAL AND LABOUR.

EDINBURGH TOWN COUNCIL AND THE CONTRACT SYSTEM.—A meeting of the Edinburgh Town Council was held on the 7th inst., Lord Provost Russell presiding. The Lord Provost's Committee submitted the findings of the various committees in reference to the proposal to insert in the form of offer for city contracts a declaration to the effect that in the execution of these, contractors shall pay the standard recognised rate of wages, or such wages as are generally accepted as fair in the trade.—Mr. Sloan moved that the recommendation of the Cleaning and Lighting Committee be the finding of the Council—namely, that the insertion of any declaration such as that recommended would be an unwarrantable attempt to interfere with the security of contracts by importing into them a dangerous and contentious principle.—Mr. Cranston seconded.—Mr. Mackenzie said it seemed from the findings of the different committees that the matter could not be very well understood by them. He moved, accordingly, "That the whole matter of the city contracts be remitted to a special committee to inquire into all the circumstances, and report on an early day to the Council."—After much discussion, which turned on the meaning to be attached to the declaration, Bailie Steel proposed an amendment to remit to the Lord Provost's Committee to define the terms of the proposed declaration, and Mr. Pollard seconded.—A vote was taken on this amendment by itself, with the result that the amendment was carried by 18 votes against 17.—Mr. Sloan asked if the division had the effect of shelving his motion?—The Lord Provost replied in the affirmative.—Subsequently, on the motion of Messrs. Mackenzie and Mitchell Thomson, the standing orders were suspended and the whole matter of the city contracts was remitted to the Lord Provost's Committee to inquire into all the circumstances and report to the Council.

MEETINGS.

FRIDAY, FEBRUARY 17.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. H. Collins on "Sanitary Building Construction." 8 p.m.

Society of Arts (Howard Lectures).—Professor W. C. Unwin on "The Development and Transmission of Power from Central Stations." VI. 8 p.m.

MONDAY, FEBRUARY 20.

Royal Academy of Arts.—Dr. A. S. Murray on "The Sculptures of the Mausoleum." III. 8 p.m.

Surveyors' Institution.—Mr. G. M. Freeman on "The Arbitration Act, 1889." 8 p.m.

Society of Arts (Cantor Lectures).—Professor J. A. Fleming, M.A., F.R.S., on "The Practical Measurement of Alternating Electric Currents." IV. 8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. H. V. Lanchester on "Colour Decoration." 7.30 p.m.

TUESDAY, FEBRUARY 21.

Institution of Civil Engineers.—Further discussion on Dr. Edward Hopkinson's paper, on "Electrical Railways." 8 p.m.

Society of Arts (Applied Art Section).—Mr. T. R. Spence on "Wall Papers and Stencilling." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor W. H. Corfield on "Sanitary Appliances." 8 p.m.

Glasgow Architectural Association.—Mr. S. Henbest Capper, M.A., on "The Monks and their Abbeys." 8 p.m.

WEDNESDAY, FEBRUARY 22.

Carpenters' Hall, London Wall.—Professor T. M. Thomson on "The Chemistry of Building Materials: Pigments and Protective Agents." 8 p.m. (*Admission free.*)

Liverpool Engineering Society.—Mr. George Farren on "Some Dimensions of Units." 8 p.m.

THURSDAY, FEBRUARY 23.

Institution of Electrical Engineers.—Mr. W. M. Mordey on "Testing Alternators." 8 p.m.

Society of Antiquaries.—8.30 p.m.

Dundee Institute of Architecture.—Mr. A. Macpherson on "Theories of Architectural Proportion." 8 p.m.

FRIDAY, FEBRUARY 24.

Architectural Association.—Mr. A. E. Street on "Individuality and Originality in Art." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. R. Hansford Worth on "The Methods usually adopted in Devon and Cornwall for Dressing China-clay and Tinore." 7.30 p.m.

Royal Institution.—Dr. Edward Hopkinson on "Electrical Railways." 9 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Wright Clarke on "Details of Plumbers' Work." 8 p.m.

SATURDAY, FEBRUARY 25.

Architectural Association.—Visit to the Institute of Chartered Accountants, Coleman-street Buildings, Moorgate-street, by permission of the architect, Mr. John Belcher. 3 p.m.

Builders' Foremen and Clerks of Works' Institution.—Annual Dinner, Holborn Restaurant. 6 p.m.

Edinburgh Architectural Association.—Visit to S. S. C. Library.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

22,243.—PAVING: *T. Bretherton.*—This invention relates to improvements in paving roads, or the like, and consists of a so-called "iron-crete" pavement, formed of small blocks of cast-iron filled in with concrete, pitch, and other suitable material. When laid between tramway lines it prevents the wearing down at each side, as is the case with wood or stone paving. It is specially constructed to prevent the slipping of horses, and considerably reduces the noise of traffic. It is also claimed that it will stand the ordinary wear of main roads for fifteen years without replacing.

66.—VENTILATION: *H. S. Simester.*—This specification

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Water Supply Works	Roscrea (Ireland) Union	.....	Mar. 9
*Board Offices and Technical Institute	Leyton Local Bd.	100*l.* 75*l.* 50*l.*	April 25
Police and Municipal Buildings	Brechin (Scotland) Police Com.	25*l.* 5*l.*	No Date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Drainage Works at Workhouse	Amersham Union	*Official*	Feb. 20
Cast and Wrought-iron Pipes, &c. at Gas-works	Workington Corp.	J. Johnston	Feb. 21
*Works and Materials	Sheffield Town Coun.	C. F. Wike	do.
Six Cottages, Austerby, Bourne, Lincs.	T. Wilcox	.....	do.
Stable, Coach-house, Billiard-room, &c. "Half Moon" Hotel, Aspatria	.....	Moffat & Bentley	do.
New Staircase and various Alterations, Oddfellows' Hall, Whitehaven	.....	do.	do.
Extension of Sewer	Keswick Local Board	W. Hodgson	do.
Chapel, Aberdovey	Committeee of English Presbyterians	R. Davies	do.
Alterations and Additions to Dwelling-house, Bellabeg, Strathdon, N.B.	Mr. Wattie	.....	do.
Broken and Unbroken Road Material, &c.	Warwickshire C. C.	J. Willmot	do.
Cast-iron Socket Pipes, 6 in. to 16 in. (1,600 tons)	Bury Corporation	J. Cartwright	do.
Excavating, Brickwork, &c. Gasworks	Glasgow Corporation	*Official*	do.
*Stone Paving in Carriageways and Footways	Com. of Sewers (City of London)	do.	do.
Quarrying and Carting Road Metal	Midlothian C. C.	do.	do.
Iron Bridge (two openings)	Lyons Prefecture	do.	Feb. 22
*Roadmaking and Paving Works	Hammersmith Vestry	do.	do.
Engineer's and Surveyor's Stores	Cardiff Corporation	W. Harpur	do.
Re-construction of Brick Sewers, Severn and Richmond-roads (1,400 yds.)	do.	do.	do.
Construction and Re-construction of Sewers, Tindall-street, &c.	do.	do.	do.
Road Works, Road Metal, &c.	do.	do.	do.
Twelve Cottages, Calragh	North Dublin Union	D. Morris	do.
Street-making, &c. Livingstone-street	Birkenhead Corp.	C. Brownridge	do.
New Road, Footway, &c. including Masonry of Bridge, Fencing, &c.	Nantyglo and Blaina Local Board	G. Stevens	do.
Paving (170 yds.), Tar-paving (1,000 yds.), &c.	Andover Town Coun.	A. Purkess	do.
Dressed-coping (959 yds.), Wrought-iron Railings, &c.	Burnley Corporation	F. S. Button	do.
Greengrocer's Warehouse at the Market	Burnley Town Council	do.	do.
Six Houses, Bradford	.....	A. Sharp	do.
Enlargement of School Buildings, Glanton	Glanton and Shawdon School Board	.....	do.
Alterations to Carriage Shed at Hospital	Andover U.S.A.	A. Purkess	do.
Lantern Lights, Gutters, Lead Flats, &c. Art Gallery	Manchester Corp.	J. Allison	Feb. 23
Alterations and Additions to Cottage at Waterworks	Salisbury U.S.A.	J. C. Bothams	do.
Sewering, Levelling, Paving, &c. (one street)	Hoole (Cheshire) L. B.	C. A. Ewing	do.
Road Metal, Flags, Kerbs, Setts, &c.	Gateshead Impt. Com.	J. Bower	do.
*Enlargement of School	Dagenham Sch. Bd.	Wigg, Oliver, & Hudson	do.
*Works and Materials	St. Mary (Islington) Vestry	*Official*	do.
*Road Materials	Com. of H. M. Works	do.	do.
Model Lodging-house	Salford Corporation	do.	do.
Retort House, Coal Store, &c.	do.	do.	do.
Additions, Alterations, &c. to Workhouse	Carlow (Ireland) Union	do.	do.
Granite, &c. (1,500 tons)	Spalding Impt. Com.	do.	Feb. 24
*Flower Pots, Seed Pans, &c.	LondonCountyCouncil	do.	do.
*Supply of Materials, &c.	Wood Green Loc. Bd.	C. J. Gunyon	do.
*Surface Water Drain	do.	do.	do.
Stables, Stores, &c. Bideford	R. Dymond & Son	R. T. Hoskway	do.
Timber, Bricks, Cement, &c.	Gt. Yarmouth T. C.	J. W. Cockrill	do.
Two Houses, Booth, Halifax	.....	Petty & Ives	do.
Dwelling-house, Cark-in-Cartmel	John Burns	.....	do.
Three Dwelling-houses, Lurgan	W. Gillmore	.....	do.
Construction of Electric Lighting Station	Burton-upon-Trent Town Council	T. L. Ramsden	Feb. 25
Public Conveniences, &c. Newton Heath	Manchester Corp.	J. Allison	do.
Dwelling-house, Wardhead, Tullynesole, N.B.	.....	G. Mitchell	do.
Workshop, Fittings, &c.	Warwick School Bd.	F. H. Moore	do.
Road Metal, Channelling, Setts, &c.	Bacup Town Council	Mr. Wilson	do.
School Buildings, Spalding	National Schools Com.	.....	do.
Road Works, &c.	Stockport Corp.	J. Atkinson	do.
Setts, Kerbs, Flags, &c.	do.	do.	do.
Wrought-iron Roofs at Electric Lighting Station	Burton-upon-Trent Town Council	F. L. Ramsden	do.
Water Mains, 3 in. by 2 in. (940 yds.) and Laying same	Pontefract Twn Coun.	J. Heseltine	do.
Bridge (Iron and Masonry), Lough Gara	Sligo Grand Jury	*Official*	do.
Granite and Limestone Road Materials (Broken and Unbroken), Bamber Bridge, Lancs.	Walton-le-Dale Local Board	.....	do.
Flags, Bricks, &c. at Cemetery	Bacup Town Council	do.	do.
Steel Rails, &c.	Bombay, Baroda, & Central India Ry.	do.	do.
Broken Granite (12,800 tons), Broken Slag (4,120 tons), Boston, Lincs.	.....	do.	Feb. 27
Free Library, Technical School, &c.	Holland (Lincs.) C. C.	do.	do.
Construction of a Timber Wharf, &c. Queen's Island	Nelson (Lancs.) Corp.	Holtom & Fox	do.
Enlargement of Gasholder to 4-lift	Belfast Harbour Com.	G. F. L. Giles	do.
*School Buildings, Plasher	Rotherham Twn Coun.	C. B. Newton	do.
*Road-making Materials	East Ham Sch. Bd.	R. L. Curtis	do.
*Steam Road Rollers, Water-vans, Carts, &c. (on hire)	Kingston-upon-Thames Corp.	*Official*	do.
	Mortlake Highway Board	H. Richards	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	Architect, Surveyor, or Engineer.	By whom Required.	Tenders to be delivered.
*Alterations North-Western Hospital	Met. Asys. Bd.	Pennington & Bridgen	Feb. 27
*Painting Work, do.	do.	do.	do.
Additions to Municipal Buildings	Carlisle Corporation	W. H. Smith	do.
Pavilion and Nurses' Annexe at Hospital	Derby Corporation	R. J. Harrison	do.
Bank Premises, Pontypool	London & Prov. Bank	Seward & Thomas	do.
Lecture Hall, Leeds	Committee of Eldon Wesleyan Church	G. F. Danby	Feb. 28
Widening, Kerbing, Channelling, &c. (three roads)	Poole Town Council	J. Elford	do.
Mansion House, Corskellie, Rothiemay, N.B.	.....	Ross & Macbeth	do.
Street Works and Construction (eight streets)	West Hartlepool Corp.	J. W. Brown	do.
Flagging, Crossing, Channelling, &c.	do.	do.	do.
Gas Mains, Turned and Gored (800 yds.)	Market Harborough Gas Co.	F. Armitage	do.
Gas Mains, 20 in. to 12 in. (900 yds.)	Brighouse Local Board	J. Parkinson	do.
Relief Offices, &c. Worthing, Sussex	East Preston Union	R. S. Hyde	do.
Wrought-iron Roof, &c. at Gasworks, Egremont	Wallasey Local Board	H. A. Hill	do.
*Works and Materials	Hornsey Local Board	T. de Courcy Meade	do.
*Paving and Kerbing Market	Brentford Loc. Bd.	J. H. Strachan	do.
*Materials for Fire Brigade Station, New Cross	LondonCountyCouncil	*Official*	do.
*Additions to Stores, Erith	Royal Arsenal Co-op. Soc.	J. O. Cook	do.
Retort Setting and Various Works	Guildford Gas Light & Coke Co.	Mr. Lloyd	do.
Sluice Gates, Marne and Saone Canal	Haute-Marne Prefect.	*Official*	do.
Filter Chamber and various Water Supply Works	Paignton Local Board	do.	do.
Lock Gates (three pairs), Blackwall	West India, & London & India Joint Docks Committee	do.	do.
Broken Granite, Flints, Sand, &c. Bedford	Bedfordshire C. C.	do.	do.
Broken and Unbroken Granite, Kerbs, Setts, Flags, &c.	Ramsbottom Loc. Bd.	do.	Feb. 29
School Buildings, Caretaker's House, &c. Jarrow	Hedworth, Monkton, & Jarrow U. D. Sch. Board	do.	Mar. 1
Road Metal, &c.	Hardingstone (Northants) Local Board	do.	do.
Granite, Road Metal, &c. Doncaster	Lower Strafforth and Tickill Highway Bd.	do.	do.
*Supply of Materials	Borough of St. Helen's	do.	do.
*Works and Materials	Chiswick Local Board	A. Ramsden	do.
*Wood Paving Works	Fulham Vestry	T. P. Norrington	do.
*Making-up and Paving Roads	do.	W. Sykes	do.
Road Materials, Pipes, &c.	Vestry of St. Leonard, Shoreditch	*Official*	Mar. 2
Town Offices, &c.	Littlehampton Loc. B.	H. Howard	do.
*Additions, S. W. Hospital	Met. Asylums Board	T. W. Aldwinckle	do.
*Paving Works	Bethnal Green Vestry	F. W. Barratt	do.
Bessemer Steel Rails (6,240 tons), Sleepers, &c.	S. Pearson & Son	.....	do.
Road Metal, Gravel, &c.	Salisbury Highway Bd.	D. Morrice	Mar. 3
Residence, Cleckheaton	J. G. Mowat	Mawson & Hudson	Mar. 6
Public Baths and Washhouses, Southwark	Vestry of St. Saviour's	F. J. Smith	do.
Road Works, &c.	Wigton Highway Bd.	J. Sibson	do.
*Works and Materials	Hendon Local Board	S. S. Grimley	do.
*Sewer Road Works	do.	do.	do.
*Alterations to Workhouse	Petworth Union	H. Howard	do.
*Cement Rendering, Darenth Asylum	Met. Asylums Board	A. & C. Harston	do.
*Laying Surface Water Drain, &c. &c. &c.	Hanwell Loc. Bd	S. Barnes	do.
Sludging Waterloo Lake, Roundhay Park	Leeds Corp.	*Official*	do.
*Alterations and Additions to Workhouse	Bedwellty Union	W. L. Griffiths	do.
*Wrought-iron Fencing	LondonCountyCouncil	*Official*	Mar. 7
Granite, Road Metal, &c.	East Retford T.C.	J. D. Kennedy	do.
*Extension of Cemetery	Enfield Burial Board	*Official*	Mar. 9
Road Metal, Kerbs, Setts, &c.	York Corporation	A. Creer	Mar. 11
Widening Line, Manchester and Salford	Lancashire and Yorkshire Rly. Co.	*Official*	Mar. 14
Three Terrace Houses, Harrogate	E. Miller	H. E. & A. Bown	No Date
Additions, &c. to Highfield House, Castleford	.....	W. J. Morley	do.
Detached Villa Residence, Rushbrook, Co. Cork.	.....	J. F. M'Mullen	do.
Temporary Stand (2,000 people) Manchester	J. T. Hughes	.....	do.
Five Houses, Peterborough	J. Eassom	James Ruddle	do.
Road Metal, &c.	Towcester Hwy. Bd.	R. W. Rolf	do.
Drainage of Land (800 acres) South Yorkshire	A. Buckley	.....	do.
Road Metal, &c.	Wonford (Devon) District Highway Board	J. Bray	do.
Supply and Erection of Warming Apparatus	Golcar (Huddersfield) Conservative Club	.....	do.
Filter-bed Tank, Boundary Wall, &c.	Paisley Water Com.	R. Sharp	do.
Retorts, Fire-bricks, &c.	Dewsbury T.C.	C. A. Craven	do.
Retorts, Fire-bricks, Fire-clay, &c.	Darwen T.C.	T. Duxbury	do.
Additions and Alterations to School Buildings, New Barnet	.....	F. Child	do.
Additions to Elton Fold Mills, Bury	.....	T. Wilde	do.
Two Semi-detached Houses, Burley-in-Wharfedale	.....	Isitt & Adkin	do.
Construction of March Dyke, Birkenshaw and Woodbank, Linlithgow	Glen & Henderson	.....	do.
*New Offices, Bradford	Prudential Assur. Co.	A. Waterhouse & Son	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Borough Surveyor	Eastbourne Corp.	300*l.* &c.	Feb. 28
*Inspector of Nuisances	St. Alban's T.C.	100*l.*	do.
*Assistant, Furniture Branch, H.M. Works	Civil Service Com.	.....	No Date

Those marked with an Asterisk (*) are advertised in this number. *Competition, p.* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, p.* xx.

relates to an improved automatic apparatus for governing the flow of air, cleansing the air, and for evaporating fluids. It consists of air chambers fitted with diaphragms, cones, and flaps, variously centred, and in some cases with a balance adjustable by sliding rack, screw, or wedge. The diaphragms, cones, and flaps may be of gauze, wire, or other material. It also consists of tubes or other apparatus formed of porous or fibrous absorbent conducting material, or tubes or other apparatus clothed or hung in or outside, or both, with porous or fibrous absorbent conducting material, for evaporating fluids to cool, disinfect, or perfume the air. The clothing or hanging is made to dip into a well holding the fluid to be evaporated. Any part of the apparatus may be used with or without the arrangement for evaporating fluids.

590.—WOOD DECORATION: *A. Wardrop.*—This invention relates to a method of ornamenting and decorating wood and other substances. On the surface to be decorated is traced, in any convenient manner, the required design. A metallic tool of the required shape and size, and provided with a suitable handle, is then heated moderately, and with this such portions of the design as are not desired to be very deep are burnt out. Other parts that are desired to be deeper may be burnt out with the same or a similar tool more highly heated. After the burning has been completed, the surface is rubbed, or brushed, to remove all superfluous matter, and is then painted over with bitumen and benzoline in solution. If necessary, or desirable, all the surface that has not been burnt may be stained of the required colour. The design is then painted in with the necessary oil colours, mixing up with the same an unusually large proportion of terebine. If preferable, the outline of the design may be traced with black or other paint, mixed also with an excess of terebine. When all is thoroughly dry and hard, it is generally expedient to polish the surface with French polish.

2,161.—VENTILATORS: *A. W. Kershaw.*—The object of this invention is to produce an improved exhaust ventilator for buildings, ships, railway carriages, sewers, chimneys, &c. It consists of an arrangement of three or more concentric series of fixed deflectors, or baffle-plates, arranged hit and miss, so that the opening or openings in any one series shall be opposite the deflectors in the next inner or outer series. A movable cover to the shaft of the ventilator may be adapted for ships, actuated to rise and fall on a central spindle, or by any other ordinary mechanical contrivance. The various deflectors may be spherical, conical, cylindrical, or a modification or combination of all these. This patent is a modification of patent No. 2,116 of 1882.

2,809.—CONCRETE WALLS: *T. Potter.*—This patent refers to an improved appliance for building monolithic concrete walls. The inventor employs standards or guides of angle iron or steel, rivetted together, and with a pad of wood or metal between. Through this pad are placed flat bars of iron or steel, called "wall gauges," and which have a series of holes. Wall cramps are also used made of bar iron, with holes at each end, through which are passed bolts, having a series of pin holes to regulate the thickness of the intended walls. Angle, or other iron stays, or struts are used to keep the standards or guides in position Angles of walls are formed with wood fixed to the standards with iron wedge clips.

2,964.—STONE WORKING: *M. M. Kaun.*—This invention has reference to an improved apparatus for use in working stone with abrasive grinding material, and is used in combination with the machine employed. A tank is provided containing the grinding material. An elevated distributor is located above the tank, and an injector leads thereto. The injector comprises a vertical supply pipe, and an eduction pipe is arranged substantially in line with the supply pipe, and is provided with an intensifying neck, tapering in regular lines, and without recesses for the lodgment of the grinding material. A steam supply nozzle extends into the eduction pipe for the purpose of ejecting the material. Suitable slide gates are arranged within the distributor, and within the pipes leading therefrom, and serve to control the openings in the pipes, these slide gates having a flat bearing face and bevelled edges. Suitable bevelled guides cover the edges of the bevelled edges.

3,466.—SEWER PIPES: *D. G. Andrew.*—This is an invention relating to the construction of an expanding appli-

ance adapted to be placed in the interior of drain and other pipes when being laid, so as to hold them in position while the joint is being run; also adapted to be placed in the pipes to stop or dam them in any required point in searching for leaks, &c. It consists of an indiarubber ring, to be expanded by means of a frame having a number of jointed arms mounted on a central rod in such a manner that when the appliance is placed in position by turning a screw the jointed arms are moved outwards, so as to expand the ring and press it against the interior peripheries of the pipe, where they butt, thus covering the joint while the cement is being run round the exterior of the pipes. When the appliance is to be used for stopping or damming a pipe, one end or side of the ring is covered in by any suitable flexible waterproof fabric.

3,778.—ROOFING CLIP: *J. T. Asten.*—This invention relates to a clip for holding and fixing slates or tiles when used to repair roofs, and is intended to supersede the metal strips now in use. It consists of a strip of any suitable metal, such as zinc or galvanised iron. In one end of this strip is pressed up, formed, or attached a lip standing sufficiently proud of the strip to receive a slate or tile. Near the other end of the strip are holes for the fixing of the nails.

4,553.—PORTLAND CEMENT: *J. W. Knights.*—In burning the material used in making Portland cement, the object is to obtain a hard clinker which will not fall to dust when exposed to the atmosphere. Any dust formed in the kilns seriously diminishes the strength of the cement. To prevent this the inventor uses common salt (chloride of sodium), which is placed in the kiln with the raw material and the fuel in layers,—a layer of fuel, a layer of raw cement, and a sprinkling of salt, and so on. During the heating of the kiln the salt is absorbed by the cement, and prevents the formation of dust. If the salt is incorporated with the raw material, instead of being sprinkled in the kiln, it will not produce the same effect. Chloride of potassium may be used instead of chloride of sodium with the same effect.

5,390.—PAVING BRICKS: *J. Hamblet, jun.*—This invention consists in making the frog, indent, pattern, or puckered surface, forming the tread of the brick on both faces of it, instead of only on one face as in paving bricks of the ordinary kind, so that the brick can be laid with either treading face upwards, and when one of the faces is worn the brick can be inserted, so as to bring its unworn treading face uppermost, and relaid in that position. The treading surface is made by pressure after the brick has been moulded.

11,891.—SAWS: *W. and C. Junge.*—This inventor provides band and similar saws, having on one or both sides channels designed to allow the passage of the waste directly behind the saw. These channels extend in a straight or curved line from the front edge of the teeth obliquely to the back of the blade. At the front part of the teeth they are deepened, so as to form the teeth with sharp edges for cutting the sides of the kerf, whilst they are preferably widened a little towards the back of the blade to facilitate the passage of the waste. Along the channels are ribs of any desired section, the front part of which is generally undercut, and is sharpened to cut the base of the kerf. Either of the two cutting edges of each tooth may be straight or curved, and form any desired angle with the other. According as the channels are formed on one side, or on both sides of the blade, the saw will cut one smooth and one comparatively rough surface, which is required for certain classes of work, or two smooth surfaces. In the former case the edge for cutting the base of the kerf has also to cut one side of the latter, and must, therefore, be sufficiently undercut to effect this purpose.

NEW APPLICATIONS FOR LETTERS PATENT.

January 23.—1,404, J. Merrill, Automatic Flushing Syphons.—1,410, E. Lea, Hinges.—1,418, E. Nowell and T. Chitham, Combination Saw Set.—1,422, T. Avill and others, Mitre Cramp.—1,446, G. Colwell, Window-fastenings.—1,465, H. Bray, French Windows.

January 24.—1,562, W. Majert, Fire-bricks.—1,577, C. Hattersley, Fire-grates.—1,599, R. Pond, Screws.

January 25.—1,603, E. Rathbun, Chimneys.—1,629, S. Achurch, Window-fastener.—1,645, J. and J. Wilson, Chimney and other Cowls.—1,677, W. Webster, Manufacture of Cement.—1,682, J. Muller, Water-closets.—1,703, T. Blow, Saws.—1,707, C. and J. Smith, Roofs for Buildings.

January 26.—1,734, H. Sichelschmidt, Parquet Flooring.—1,746, C. Showell, Hinges.—1,794, J. Fall, Fastening for Doors and Windows.

January 27.—1,809, A. & W. Westwood, Fanlight, Skylight, and other Window Fittings.—1,828, W. Butterfield, Paint Cans, &c.—1841, J. Jones and others, Casement Windows and Doors.

January 28.—1,907, J. Hancock, sen., Cisterns for Water-closets.—1,919, J. Barnsley, Ball Taps.—1,921, T. Bury, Device to do away with the Wall Plate and Upper Plate in Glass Houses constructed with Wooden Rafters by a Combination of Iron and Wood.—1,923, R. Harrison, Opening, Closing, and Adjusting Fanlights, Sashes, and Ventilators.—1,927, A. Morgan, Glazing Bars or Astragals, and securing Glass Sheets thereto.

January 30.—1,978, B. Phillipson, Connexions of Water-closets Basins, &c.—1,985, J. Sumner, Attaching Door-knobs to Doors, &c.—2,014, W. Sheas and A. Barratt, Device for the use of Bricklayers.—2,043, S. Johnson, Disinfecting and Ventilating Houses, &c.—2,046, H. Lake, Apparatus for Boring Tunnels, &c.—2,055, A. Bridgman and D. House, Saw Benches.—2,056, H. Saqui and others, Bolts or Fasteners for Doors, Windows, &c.

January 31.—2,072, S. Rex and W. Wright, Cowl.—2,095, W. Kelvin, Taps for Water, &c.—2,098, J. Moscrip, Inspection and Cleaning Eye on Drain Pipes.—2,102, M. Carmody, Window Fasteners.—2,165, J. Barton, Preventing Chimneys Smoking.

February 1.—2,169, W. Abert and W. Scherer, Paints.—2,095, R. Worrall, Wrought Metal Gates, Grills, and Railings.—2,275, H. Lake, Sash-fasteners.—2,277, J. Lumley, Marking or Striking-out the Moulds of Stair Handrails.

February 2.—2,321, H. Hall, Sections for Girders or Ribs for Architectural or other Purposes.—2,326, W. Swain, Sash-fastener.—2,330, A. Harris and others, Ventilators or Down Draught Preventers.—2,335, J. Kleine, Floors and Ceilings.

February 3.—2,374, F. Stokes, Continuous Treatment of Cement, Lime, and Like Materials, and in the Lining of Furnaces and Kilns for Burning such Substances.—2,438, J. Jemson, Stoves and Fireplaces.—2,440, J. Allen, Number and Letter Plates and other Attachments for Doors and Door Frames.—2,441, C. Hancock, Cisterns and Water Pipes.

February 4.—2,479, H. Sutcliffe, Water-closets and Apparatus connected therewith.—2,487, S. Browne, Cabinets and their Internal Fittings.—2,497, J. Dean, Fireplaces.—2,498, W. Horn, Wood Moulding Machines.—2,533, A. Fowler, Water-closets.—2,534, T. Kemp, Plug Stopper with Purchase Handle for Testing Pipe Drains with Water.

PROVISIONAL SPECIFICATIONS ACCEPTED.

20,708, T. Payne, Fire Grates, Stoves, Ranges, and Slow Combustion Stoves.—23,088, W. Smith, Protecting Timber Structures from Sea Worm.—23,636, W. Allardice, Domestic Fire-grates.—23,743, C. Henderson, Sash Fastener.—23,864, J. Adair, Baker's Ovens.—24,022, J. Harrison, Sash-fasteners.—1893.—67, F. Ryland, Pulleys, or Axile Pulleys.—255, A. Yates and others, Closets.—357, W. Taylor, Ventilator or Chimney Cowl.—657, J. Wallace, Saws.—684, W. Clarkson, Draught or Weather Excluders.—801, J. Moore and others, Construction of Lead or other Pipes to Prevent their Bursting.—836, H. Hughes, Stained Glass Panels.—22,772, J. Jones and J. Rawson, Window Sash-fastener and Rattling Preventer.—23,056, T. McKenzie, Chimney Cowls.—23,975, W. Horne and F. Hain, Non-slippery Pavement.—346, A. Morrison, Securing Door-knobs or Handles to Spindles.—349, P. Mooney, Flushing Cisterns, or Apparatus for Water-closets, Urinals, &c.—352, W. Oates and others, Gully Traps.—353, W. Oates and J. Green, Square-top Gully Traps.—364, J. Merrill, Flushing of Water-closets.—406, L. Gough, Draught Preventer.—536 S. Gelston, Iron or Metal-covered Buildings and Materials therefor.—588, G. Sparrow, Preventing Water-pipes from Bursting.—679, J. Green and W. Oates, Gullies, Traps, and Syphons.—743, J. Cabhrein, Door Bolts.—1,067, J. Sherson and H. Crisp, Tops or Guards of Chimneys and Ventilating Shafts.—1,100, J. Blackburn, Raising, Lowering, Sustaining, Balancing, and Securing of Sashes for Windows, Doors, &c.—1,194, J. Hamblet, jun., Roofing Tiles.—1,246, W. Edwards, Gas-lighting Appliances.—1,374, G. Paterson and J. Chanter, Retaining Window Sashes at any desired height.—1,465, H. Bray, French Windows.—1,562, W. Magirt, Fire Bricks.—1,707, C. & J. Smith, Roofs for Buildings.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

4,061, G. Williamson, Kitchen Ranges.—5,054, A. Ransome, Band Sawing Machines.—5,292, W. Morton, Constructing Parts of Wall, Partitions, and Ceilings.—6,009, S. de Ferranti and J. Noad, White Lead and Chrome Pigments.—12,648, W. Munns, Water-closets.—23,080, J. Hunt, Roof, Gutters, and Valleys.—4,286, E. Fulcher, Moulding Paving Slabs, Building, Ornamental, and other Blocks and Bricks.—5,647, J. Dungey, Fittings for Gas and other similar Pipes and Tubes.—5,950, W. Kinnipple, Caissons or Bridges to close and open, or bridge across, and leave clear as required the entrances to Graving Docks, Wet Docks, Harbours, Rivers, or Estuaries, &c.—6,146, M. Perret, Stoves or Fireplaces.—6,606, H. Sutcliffe, Domestic Fireplaces.—10,111, J. Williams, Caps, Pots, or Tops for Chimneys, Ventilating Shafts, &c.—21,525, J. Anderson, Fastenings for Doors and Windows.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

FEBRUARY 6.—By *Weatherall & Green:* 4, Blue Cross-st., Leicester-sq., f., r. 65*l.*, 1,300*l.*; 5 and 6, Parnell-ter., Southgate, u.t. 83 yrs., g.r. 10*l.*, 215*l.*; 9 and 10, Canonbury-sq., Canonbury, u.t. 25 yrs., g.r. 4*l.*, 705*l.*; i.g.r. of 47*l.* 14s., High-st., St. John's Wood., u.t. 8 yrs., g.r. 10*l.* 11s., 205*l.*

FEBRUARY 8.—By *F. J. Bisley & Sons:* 11 and 12, Martin-st., Bermondsey, u.t. 45 yrs., g.r. 10*l.* 10s., r. 57*l.* 4s., 460*l.*; 13 and 14, Martin-st., u.t. 45 yrs., g.r. 11*l.*, r. 57*l.* 4s., 450*l.*—By *R. Tidey & Son:* 2 to 5, Arthur-st., Oxford-st., f., r. 284*l.*, 5,860*l.*; 6 to 9, Arthur-st., f., r. 262*l.*, 5,200*l.*; 10, 11, and 12, Arthur-st., f., r. 145*l.*, 2,745*l.*; 14 and 16, Arthur-st., f., r. 165*l.*, 3,560*l.*; 17, Arthur-st., f., r. 110*l.*, 2,200*l.*; 18 and 19, Arthur-st., f., r. 105*l.*, 2,010*l.*; 20 to 23, Arthur-st., f., r. 210*l.*, 3,850*l.*; 24 to 28, Arthur-st., f., r. 196*l.*, 3,945*l.*

FEBRUARY 9.—By *Stimson & Sons:* 37, Camden-st., Walworth, f., 200*l.*; 23, Inville-rd., u.t. 57 yrs., g.r. 5*l.*, 280*l.*; 12, Bagshot-st., Old Kent-rd., and 84, Kinglake-st., u.t. 12 yrs., g.r. 2*l.*, r. 46*l.* 4s., 130*l.*; 6 to 14 (even), Leo-st., u.t. 67 yrs., g.r. 20*l.*, 415*l.*; "The Rose and Thistle" beer-house, Leo-st., sold before auction; 121, 123, 125, Blakes-rd., Peckham, u.t. 62 yrs., g.r. 12*l.*, 500*l.*; 4, Lowden-rd., Herne Hill, sold before auction; 7, Millman-st., Holborn, u.t. 57 yrs., g.r. 6*l.*, 660*l.*; 6, Fenelon-rd., Kensington, u.t. 45 yrs., g.r. 3*l.* 10s., 185*l.*—By *A. J. F. Gibbons:* 19, Queen Ann-rd., Hackney, u.t. 52 yrs., g.r. 5*l.*, r. 28*l.*, 280*l.*; 76, Paragon-rd., u.t. 46 yrs., g.r. 5*l.*, r. 32*l.*, 365*l.*; 269, Amhurst-rd., u.t. 73 yrs., g.r. 6*l.*, 320*l.*—By *Newbon & Co.:* 148, 150, 152, High-st., Stoke Newington, u.t. 85 yrs., g.r. 90*l.*, r. 415*l.*, 4,710*l.*; 154, 156, and 158, High-st., u.t. 85 yrs., g.r. 90*l.*, r. 435*l.*, 5,500*l.*; 58 and 72, Maury-rd., u.t. 84 yrs., g.r. 14*l.*, r. 78*l.*, 705*l.*; 73, 77 to 83 (odd), Maury-rd., u.t. 88 yrs., g.r. 33*l.* 10s., r. 178*l.*, 1,575*l.*; 85, 87, 89, and 91, Brooke-rd., u.t. 84 yrs., g.r. 29*l.*, r. 152*l.*, 1,355*l.*; 67, 71, 73, 77, 81, 83, Brooke-rd., u.t. 84 yrs., g.r. 43*l.*, r. 228*l.*, 2,095*l.*; 57, 59, 61, 65, Brooke-st., u.t. 84 yrs., g.r. 28*l.*, r. 158*l.*, 1,645*l.*—By *R. Tidey & Son:* 6, 7, and 8, Maynard-st., Oxford-st., f., r. 112*l.*, 2,175*l.*; 11, 12, and 13, High-st., Bloomsbury, f., r. 213*l.*, 4,395*l.*; "The White Lion" tavern, High-st., f., r. 113*l.* 15s., 6,010*l.*; 23 and 24, High-st., f., r. 140*l.*, 3,060*l.*; No. 24, Fleet-st., f., r. 210*l.*, area 645ft., 10,100*l.*; 1 and 2, Bolt-ct., f., r. 200*l.*, area 2,493ft., 6,600*l.*; 13 and 15, Mason's-yd., Jermyn-st., f., r. 225*l.*, 4,325*l.*; 37, Frith-st., Soho, f., r. 85*l.*, 1,665*l.*; "The Green Man" public-house, Berwick-st., f., r. 80*l.*, 3,410*l.*; 58, 59, 60, 71, Berwick-st., f., r. 240*l.*, 4,910*l.*; 1 to 4, Laurence-st., Oxford-st., f., r. 140*l.*, 3,020*l.*; 6, Laurence-st., f., r. 48*l.* 3s., 805*l.*; 7 and 8, Laurence-st., f., r. 70*l.*, 1,320*l.*—By *C. C. & T. Moore:* 18, Maplin-st., Mile End, f., r. 22*l.*, 280*l.*; 60, 62, and 64, Devonshire-st., u.t. 19 yrs., g.r. 15*l.*, 300*l.*; 7 to 27 (odd), Alfred-st., Bow, u.t. 10 yrs., g.r. 46*l.* 2s., 890*l.*; 29 to 35 (odd), Alfred-st., u.t. 10 yrs., g.r. 12*l.*, r. 102*l.* 4s., 220*l.*; 1 to 10, Mary-st., u.t. 10 yrs., g.r. 36*l.*, 400*l.*—By *Wilkinson, Son, & Welch* (at Brighton): 49, Westbourne-villas, Hove, f., 830*l.*

FEBRUARY 10.—By *G. A. Wilkinson & Son:* "Marsh Court" and 279a. 3r. 14p., Hants, near Stockbridge, f., 7,500*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	9/0/0 0/0/0
Teak, E.I.	load	9/10/0 15/0/0
Sequoia, U.S.ft.cu.		2/3 2/6
Ash, Canada	load	2/10/0 4/0/0
Birch, do.		3/5/0 4/10/0
Elm, do.		3/10/0 4/10/0
Fir, Dantsic, &c.		2/0/0 3/5/0
Oak, do.		3/0/0 5/5/0
Canada		5/10/0 7/0/0
Pine, Canada red		2/10/0 3/10/0
Do. Yellow		2/10/0 4/10/0
Lath, D'ntsic, fath		5/0/0 6/0/0
St. Petersburg		5/0/0 7/0/0
Deals, Finland 2nd & 1st std	100	7/10/0 9/10/0
Do. 4th & 3rd		6/10/0 7/0/0
Do. Riga		6/10/0 8/0/0
St. Petersburg, 1st yellow		10/0/0 14/0/0
Do. 2nd yellow		8/0/0 9/0/0
Do. white		7/10/0 9/10/0
Swedish		7/0/0 15/10/0
White Sea		8/0/0 16/10/0
Canada, Pine 1st		21/0/0 27/10/0
Do. do. 2nd		15/0/0 17/0/0
Do. do. 3rd &c.		7/10/0 10/0/0
Do. Spruce, 1st		8/10/0 11/0/0
Do. do. 3rd & 2nd		6/10/0 8/0/0
New Brunswick		6/10/0 7/10/0
Battens, all kinds		3/0/0 15/0/0
Flooring boards, sq., 1 in. prep. 1st		0/8/6 0/14/6
Do. 2nd		0/7/6 0/10/6
Other qualities—		0/4/0 0/7/6
Cedar, Cuba	ft.	4 4½
Honduras, &c		3½ 4½
Mahogany, Cuba		4½ 6½
St. Domingo, cargo av.		4 1/6
Mexican do. do.		3½ 4½
Tobasco do. do.		4½ 7
Honduras do.		5 6½
Box, Turkey	ton	4/0/0 13/0/0
Rose, Rio		9/0/0 20/0/0
Bahia		8/0/0 18/0/0
Satin, St. Domingo	ft.	0/0/6 0/1/3
Porto Rico		0/0/7 0/1/6

TIMBER (*continued*).		
Walnut, Italian		0/0/3½ 0/0/7
METALS.		
Iron—Pig, in Scotland	ton	2/7/0 0/0/0
Bar, Welsh, in London		5/17/6 6/0/0
Do. do. at works in Wales		5/7/6 5/10/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British, cake and ingot		48/0/0 48/10/0
Best selected		49/5/0 49/15/0
Sheets, strong		58/0/0 0/0/0
Chili, bars		45/5/0 45/12/6
YELLOW METAL	lb	0/0/4 7-16 0/0/5½
LEAD—Pig, Spanish	ton	9/10/0 9/12/6
English com. brands		9/12/6 9/15/0
Sheet, English, 6 lbs. per sq. ft. and upwards		11/5/0 0/0/0
Pipe		11/15/0 0/0/0
ZINC—English sheet	ton	21/10/0 0/0/0
Vieille Montagne		22/0/0 0/0/0
TIN—Straits		91/10/0 92/0/0
Australian		92/0/0 92/10/0
English Ingots		95/0/0 95/10/0
Banca		93/5/0 93/10/0
Billiton		93/0/0 93/5/0
OILS.		
Linseed	ton	20/15/0 21/0/0
Cocoanut, Cochin		29/0/0 0/0/0
Do. Ceylon		27/10/0 28/0/0
Palm, Lagos		31/0/0 0/0/0
Rapeseed, English pale		27/0/0 0/0/0
Do. brown		25/10/0 0/0/0
Cottonseed ref.		26/0/0 0/0/0
Oleine		20/10/0 21/0/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/10/0 12/0/0
TAR—Stockholm	barrel	0/17/6 0/18/6
Archangel		0/12/6 0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 12 *noon on Thursdays.*]

BRUNDALL (Norfolk).—For the erection of a detached villa residence, Brundall, Norfolk, for Mr. Gurney Mason. Mr. A. F. Scott, architect and surveyor, 24, Castle Meadow, Norwich. Quantities by architect:—

	£ s. d.	Stables. £ s. d.
J. S. Smith	2,065 0 0 ..	—
G. E. Hawes	1,998 0 0 ..	—
J. Downing & Sons	1,996 0 0 ..	—
H. Lacey	1,986 0 0 ..	—
J. Youngs & Son	1,947 0 0 ..	—
Scarles Bros.	1,944 0 0 ..	—
S. Chapman & Son	1,799 0 0 ..	448 0 0
J. Evans, Norwich*	1,784 0 0 ..	393 3 0

* Accepted.

CHISWICK.—For additions and decorative repairs, &c., to a house at the corner of Bath-road and Rupert-road, Bedford Park, Chiswick, for Mr. Harry Nicholls. Mr. Walter J. Ebbetts, architect, Savoy House, 115, Strand, W.C.:—

H. Hanks	£815	J. Bryant	£786
C. F. Kearley	795	R. A. Yerbury (accepted) ..	720

CLACTON-ON-SEA.—Accepted for dwelling-house and shop in Old-road, for Mrs. Eliza Castor. Mr. F. H. Baker, architect:—

Mark Potts	£453 10

DARTFORD.—For painting and other works at the Gore Farm Hospital, near Dartford, Kent, for the Metropolitan Asylums Board. Messrs. A. and C. Harston, Architects, 15, Leadenhall-street, E.C.:—

W. Tuffee	£1,678	M. Batchelor	£1,114
G. Foxley	1,390	Lilly & Lilly, Whitcomb-street*	987
W. F. Hadlow	1,218		
Akers & Co.	1,127		

* Accepted.

EDMONTON.—For the erection of six houses in Bounces-road, for Mr. E. H. Peach. Mr. J. T. Alexander, architect, 40, Great James-street, Bedford-row, W.C.:—

Smith	£1,542	Tremain & Piper, Tottenham (accepted)	£1,060
Sorrell	1,389		

LONDON.—For alterations and additions to bank premises at Rotherhithe, S.E., for the London Joint Stock Banking Company. Mr. R. Creese Harrison, architect. Quantities supplied by Mr. A. J. Gate:—

J. O. Richardson	£4,679	Holloway	£4,100
Falkner	4,495	Williams	4,084
Stephens	4,200	Stewart	3,473
Stimpson & Co.	4,158		

LONDON.—For alterations at 12a, George-street, Hanover-square, W., for Messrs. Kirkman & Son. (Contract No. 1). Mr. John Waldram, C.E., surveyor, 13, Buckingham-street, W.C. Quantities supplied by Mr. P. J. Waldram:—

Foxley	£2,677	Nicholson	£2,364
W. Johnson & Co., Ltd.	2,596	Grover & Son	2,300
Bywaters & Sons	2,435	Nightingale (accepted) ..	2,218
T. Stevens	2,387		

LONDON.—For the erection of the Catford Sorting Office, for Her Majesty's Office of Works. Mr. Tanner, Architect:—

J. Shillitoe & Son	£1,600	B. E. Nightingale	£1,328
C. Godbolt	1,471	Wakers & Co.	1,250
Newmans, Limited	1,450	L. Whitehead & Co.	1,230
Staines & Son	1,424	Mid Kent Building Works	1,169
H. L. Holloway	1,383	J. O. Richardson	1,158
W. H. Lorden and Son	1,349	G. H. Martin & Co.	1,157
A. Black & Son	1,338		

LONDON.—For proposed extension to saloon bar, and other works at the "Beaconsfield Hotel," Green-lanes, N., for Mr. W. R. Henshley. Mr. Alfred England, architect, 33, Southampton-street, Strand:

Linzell	£267	Oldrey	267
Green & Smith, Stamford-hill (accepted)	£262 19 0		

LONDON.—For extending the Holloway to Hackney storm relief sewer to Sandringham-road, for the London County Council. Mr. A. R. Binnie, Engineer:—

Thos. Adams	£16,414 14 3	James Dixon	£12,254 0 0
John Price	14,645 14 9	John Mowlem & Co.	11,415 0 0
Iles	13,353 0 0		

LONDON.—For carrying out sanitary works at the Beresford, street School, Walworth, for the School Board for London. Mr. T. J. Bailey, Architect:—

J. Frampton	£294	J. Marsland	£184
W. V. Goad	237	J. Tyerman, 220, Walworth-road*	177
B. E. Nightingale	204		
Lathey Bros.	193		

* Recommended by the Works Committee for acceptance.

LONDON.—For the provision of additional water-closets at the infants' department of the Chicksand-street School, Whitechapel, for the School Board for London. Mr. T. J. Bailey, Architect:—

D. Gibb & Co.	£473	J. T. Robey, 194, Bow-road*	£230
Staines & Son	347		
J. N. Calnan & Co.	240		

* Recommended by the Works Committee for acceptance.

LONDON.—For enclosing, draining, levelling, and tar-paving the additional land acquired for the Brunswick-road School, Poplar; and for erecting new water-closets for the girls' and infants' departments, fort he School Board for London. Mr. T. J. Bailey, Architect:—

Peattie & Axtell	£870 0 0	J. T. Robey	£617 0 0
McCormick & Sons	664 0 0	W. Neil	600 18 3
D. Gibb & Co.	655 0 0	A. D. Morgan*	551 0 0
W. Gregar & Son	629 0 0		

*Recommended for acceptance by the Works Committee.

LONDON.—For carrying out sanitary works at the Union-street School, Woolwich, for the School Board for London:—

A. How	£236 10 0	A. Morgan	£164 0 0
C. Foreman	233 0 0	H. J. Stephens, 47, Hill-st., Woolwich*	140 0 0
J. H. Hodgin	229 0 0		

* Recommended by the Works Committee for acceptance.

LONDON.—For billiard-room, &c., Forest Lodge, Tulse Hill, S.W., for Mr. C. Adney Payne. Mr. Alfred Parnacott, surveyor, 93, York-road, Westminster Bridge-road:—

Peacock Bros. ..... £455.

Billiard Tables and Fittings.

Geo. Wright & Co. £225

LOWESTOFT.—For kitchen fittings and cooking apparatus at the Grand Hotel, Kirkley, for Mr. John Whaley. Mr. Walter Graves, architect, Winchester House, Old Broad-street, E.C.:—

Benham & Sons ..... £635 | T. Waller & Co.* £580

* Accepted.

LOWESTOFT.—For alterations and additions to Cliff House, Kirkley. Mr. Walter Graves, architect, Winchester House, Old Broad-street, E.C.:—

A. Bedwell	£425 0	W. H. Woolnough*	£325 8
J. Youngs & Son	411 0		

* Accepted.

NORTH WALSHAM.—For the erection of a detached villa residence, North Walsham, Norfolk, for Mr. Robert Bartram. Mr. A. F. Scott, architect and surveyor, 24, Castle Meadow, Norwich. Quantities by architect:—

J. Gee	£2,200 7 3	W. Wilson, North Walsham*	£1,775 10 0
S. Daws	1,880 0 0		
S. Chapman & Son	1,848 0 0		

* Accepted.

SURBITON.—For erecting a house at Southboro' Park, for Mr. Brudenell Carter. Mr. Philip Wilkinson, architect:—

Higgs	£3,485	Dorey	£3,047
Land	3,325	J. H. Jarvis, Surbiton*	2,925
Stanley Bird	3,298		

* Accepted.

SURBITON.—For making up Fleece-road for the Surbiton Improvement Commissioners. Mr. S. Mather, C.E., Surveyor:—

Iles	£857 17 4	S. Atkins	£656 0 0
Broderick	785 0 0	Ballard	653 7 0
J. B. Tomkinson	784 0 0	J. H. Jarvis	642 0 0
J. Piller	720 0 0	Kavanagh	639 3 10

Engineer's estimate £634 4 0

WEST HAM.—For the supply and erection of a steam crane, &c. at the Canning Town sewage works. Mr. Lewis Angell, Borough Engineer:—

Executors of Wm. Balmforth	£613 10	H. J. Coles	£475 0
		T. Smith	460 0
Job Isles	560 0	Wilson & Co., Limited*	450 0
Thos. Needham	506 5	Stothert & Pitt, Limited	425 0
Silvester & Co.	500 0	Rushworth Bros., Colne*	410 0
Shanks & Son	485 0	H. Pynegar	370 10
Marshall, Fleming, & Jack	480 0	Penney & Co. (for tip-wagons only)	49 0
Kerr, Stuart, & Co.	Tip-wagons £14 10s. each. Buckets 4 10s. each.		

* Accepted.

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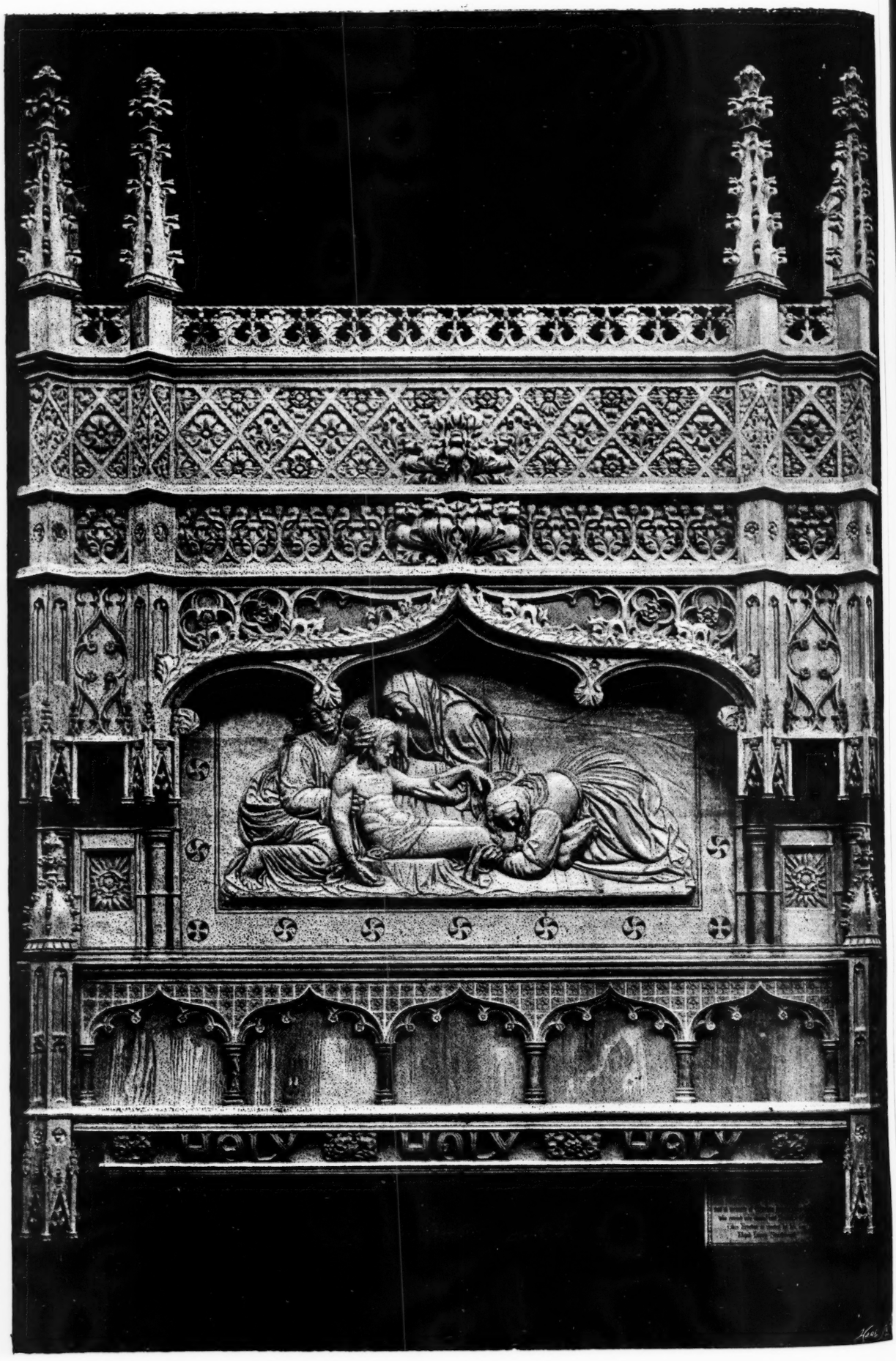

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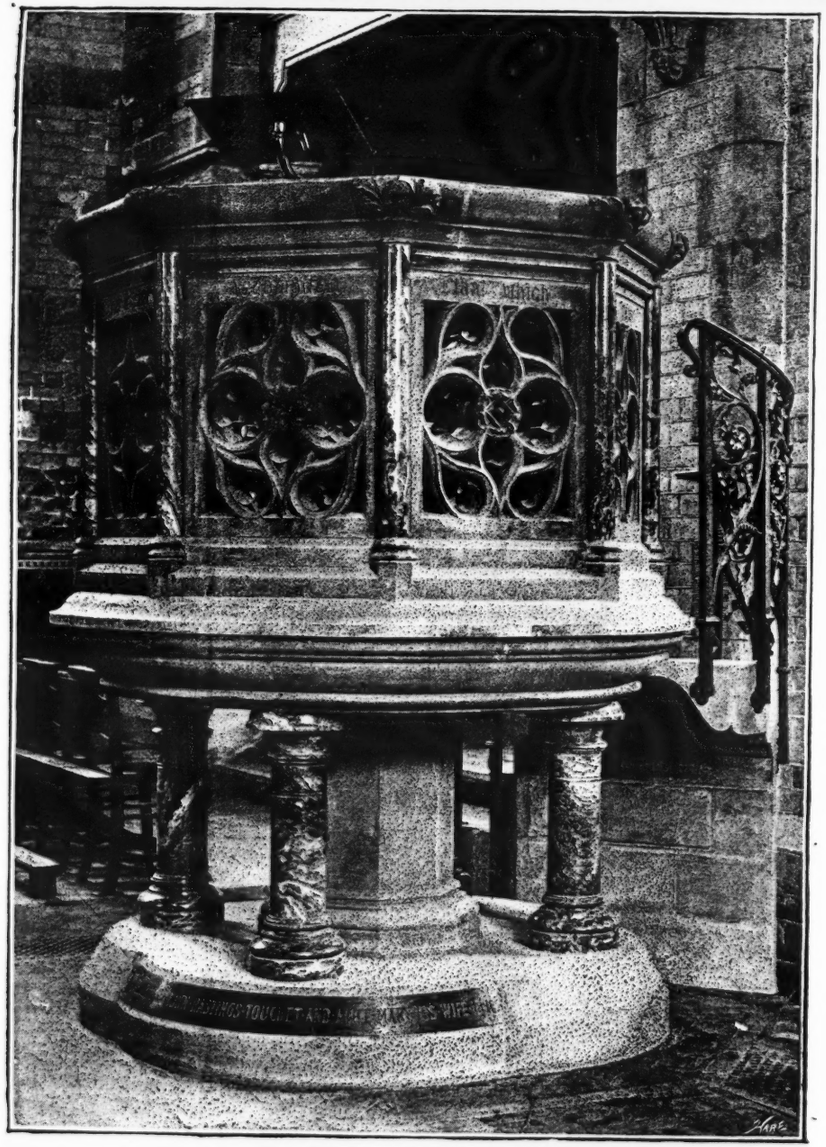

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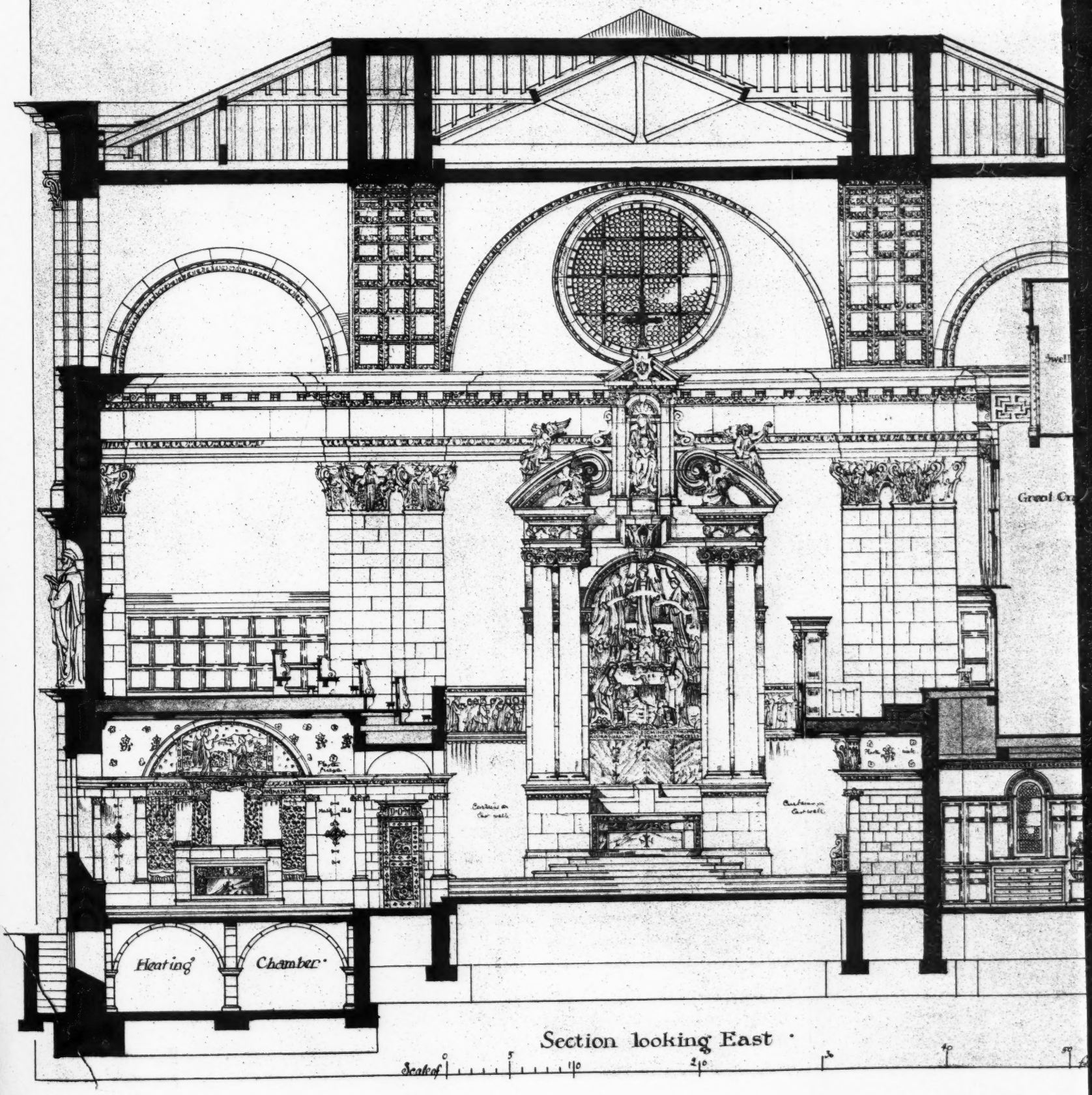

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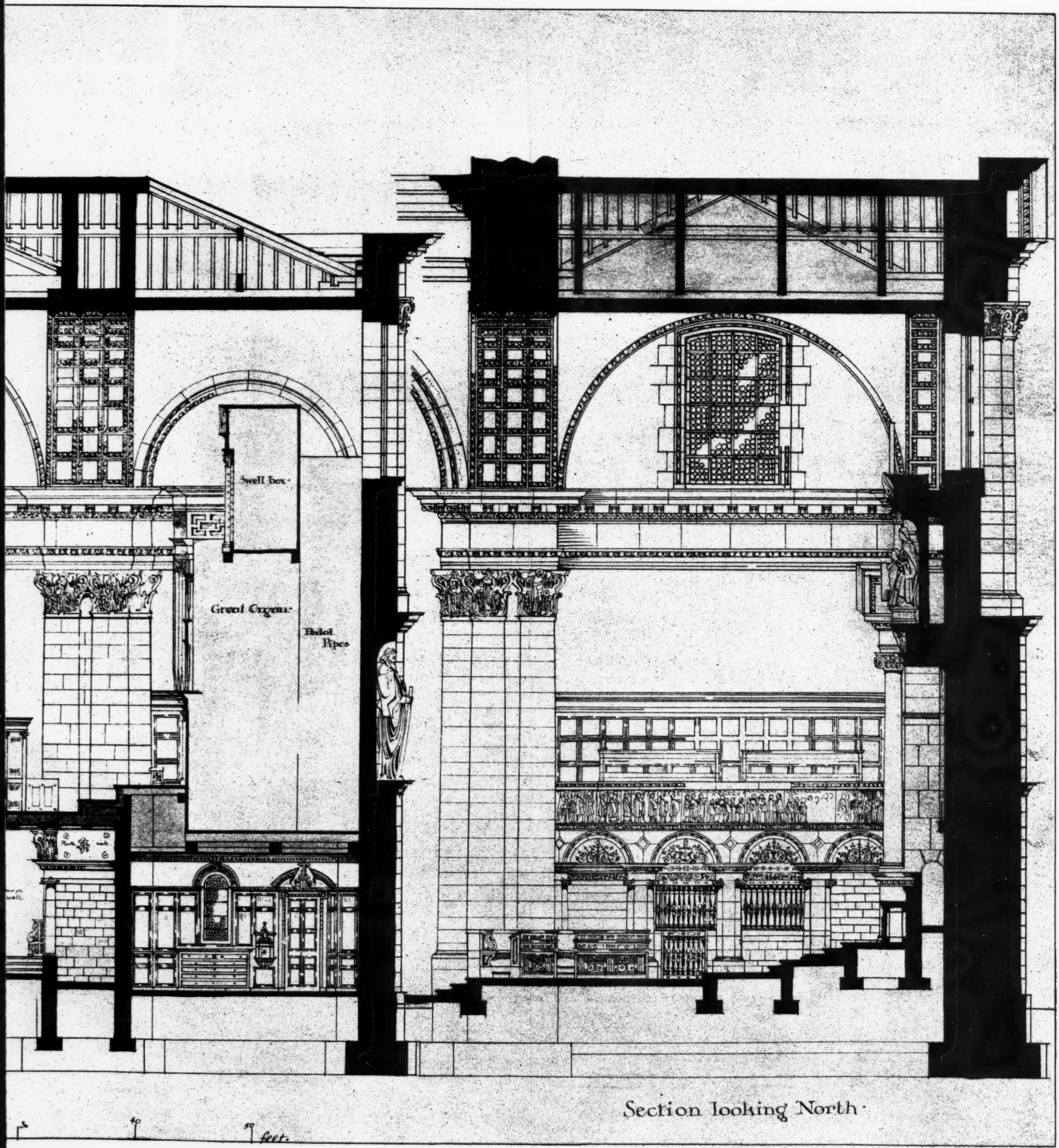

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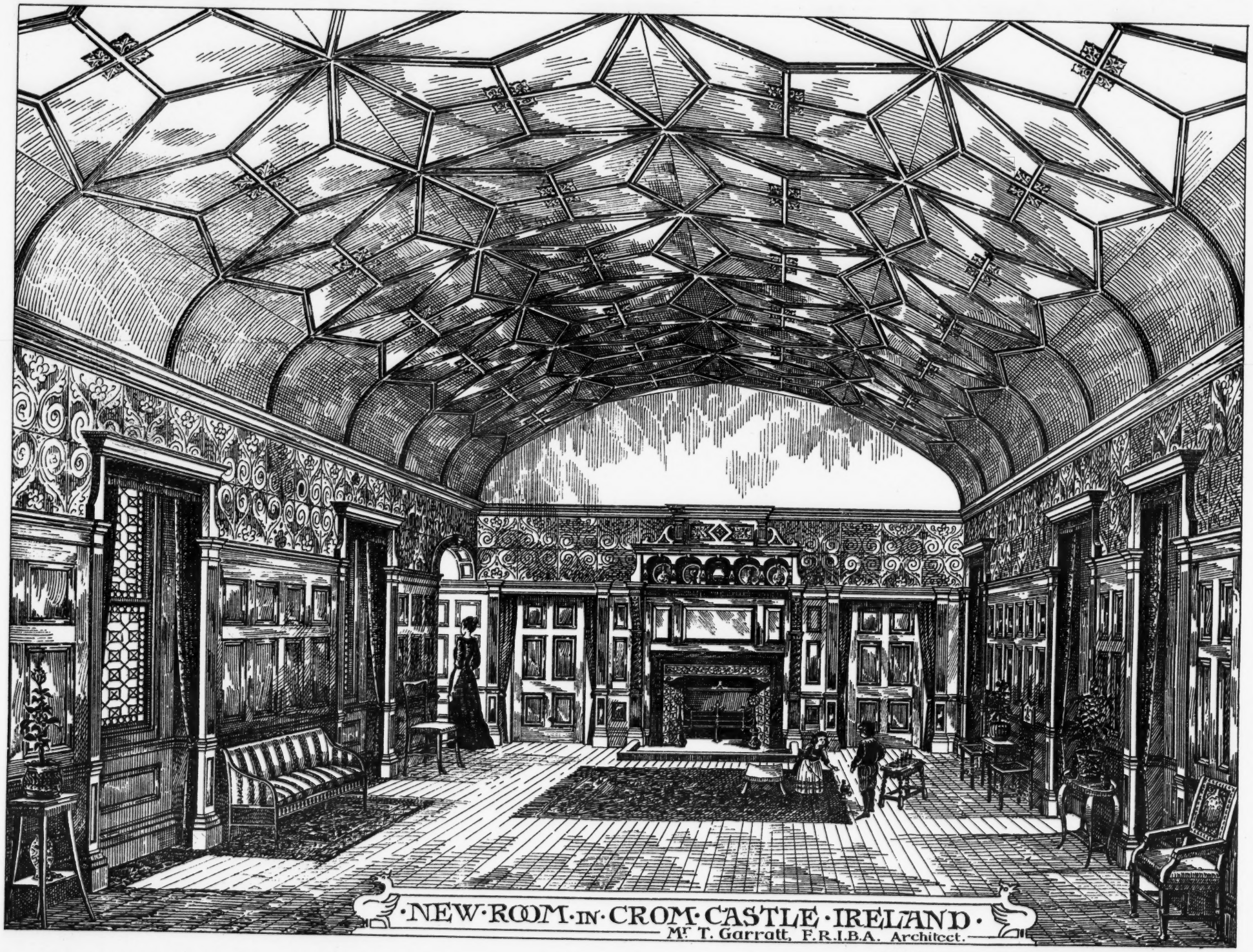

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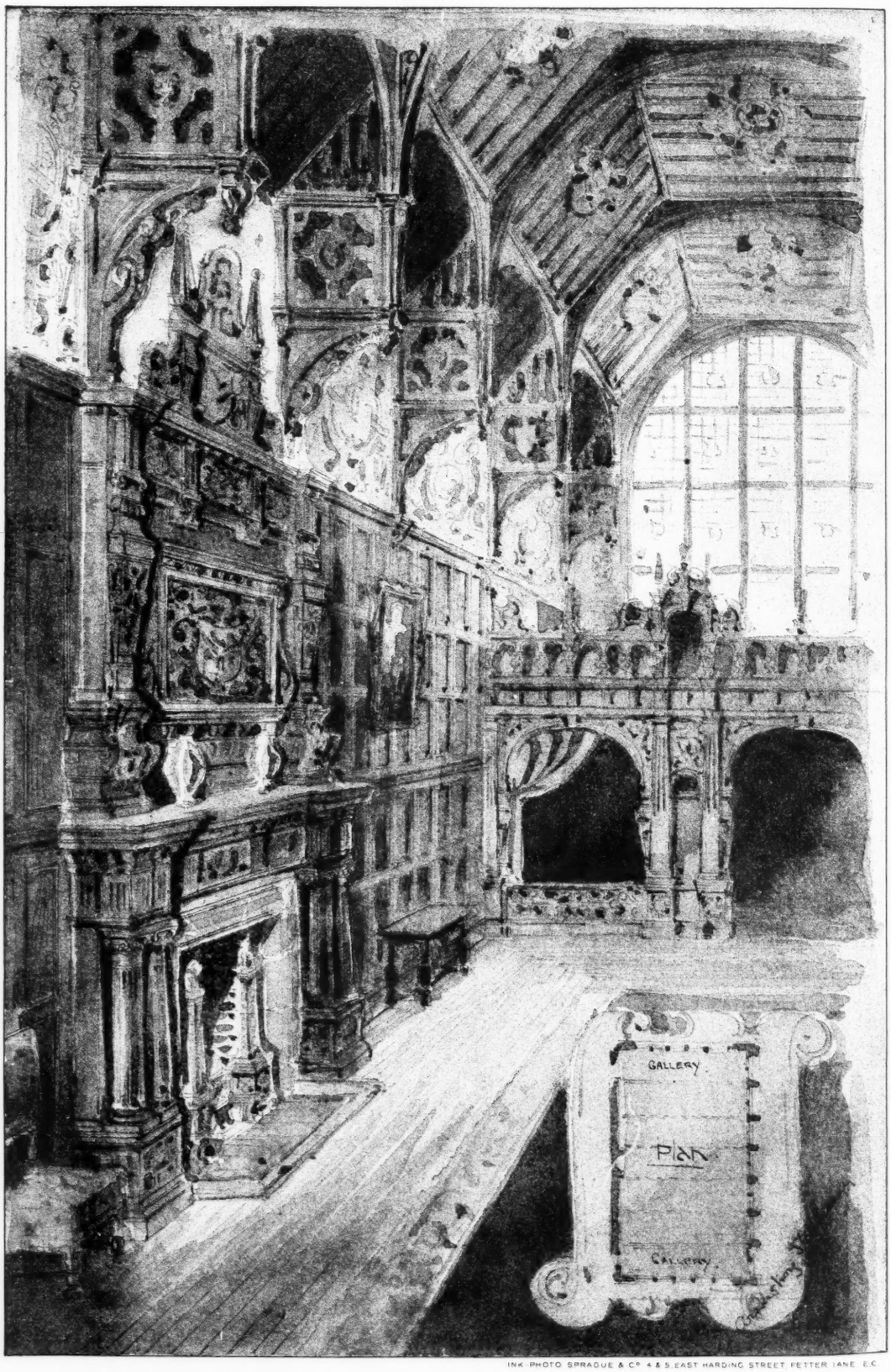

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INTERIOR OF A HALL AND BALL ROOM.—By Mr. J. Armstrong Stenhouse.

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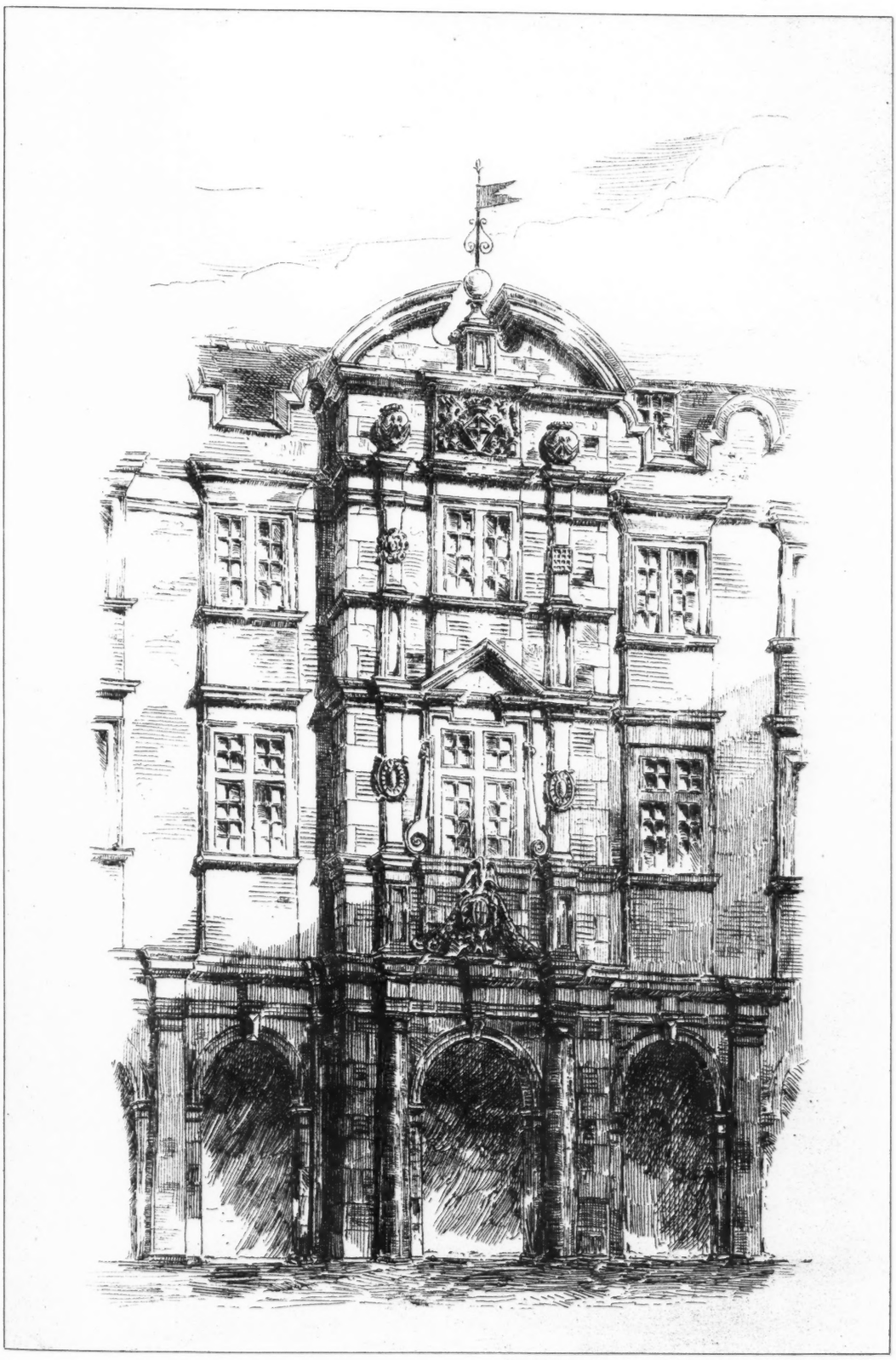

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PART OF SECOND COURT, ST. JOHN'S COLLEGE, CAMBRIDGE.—From a Sketch by Mr. William H. Thorp, F.R.I.B.A.

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